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SIXTH ANNUAL REPORT
OF THE
PENNSYLVANIA
DEPARTMENT OF AGRICULTURE.

PART II.



1900.

WM. STANLEY RAY,
STATE PRINTER OF PENNSYLVANIA.
1901.



LETTER OF TRANSMITTAL.

Harrisburg, Pa., September 1, 1901.

Hon. Wm. A. Stone, Governor of Pennsylvania:

Dear Sir: In compliance with the requirements of the Act of Assembly of March 13, 1895, and of the custom which has prevailed in this Department, I have the honor to transmit herewith Part II of my annual report for the year 1900. The report contains lists of officers of the various State organizations of farmers in Pennsylvania, together with the Acts of Legislature by which the organizations were created, and the constitution, by-laws and declarations of principles under which they act. Some of the papers read before these organizations are included in the report, and also a number selected from those presented at the local institutes during the season of 1899-1900.

Respectfully yours,

JOHN HAMILTON,
Secretary of Agriculture.



PENNSYLVANIA DEPARTMENT OF AGRICULTURE.

OFFICIAL LIST.

JOHN HAMILTON, *Secretary*,
State College, Centre County.

A. L. MARTIN, *Dep'y Sec'y and Director of Farmers' Institutes*,
Enon Valley, Lawrence County.

LEVI WELLS, *Dairy and Food Commissioner*,
To May 16, 1900.
Spring Hill, Bradford County.

JESSE K. COPE,
From June 15, 1900.
West Chester, Chester County.

BENJ. F. MACCARTNEY, *Economic Zoologist*,
Hamilton, Jefferson County.

J. T. ROTHROCK, *Commissioner of Forestry*,
West Chester, Chester County.

LEONARD PEARSON, *State Veterinarian*,
Philadelphia.

M. D. LICHLITER, *Chief Clerk*,
Pittsburg.

GEORGE G. HUTCHISON, *Clerk, Dairy and Food Commissioner*,
Warriors' Mark, Huntingdon County.

FRANK S. CHAPIN, *Clerk, Economic Zoologist*,
Milton, Northumberland County.

ROBERT S. CONKLIN, *Clerk, Commissioner of Forestry*,
Columbia, Lancaster County.

LEWIS VANDERSLOOT, *Stenographer*,
York, York County.

GEORGE F. BARNES, *Messenger*.
Rossville, York County.



AN ACT ESTABLISHING THE DEPARTMENT OF AGRICULTURE.

AN ACT

To Establish a Department of Agriculture and to Define its Duties
and to Provide for its Proper Administration.

Section 1. Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same, That there be and hereby is established a Department of Agriculture, to be organized and administered by an officer who shall be known as the Secretary of Agriculture, who shall be appointed by the Governor, by and with the advice and consent of the Senate, for a term of four years, at an annual salary of three thousand five hundred dollars, and who, before entering upon the duties of his office, shall take and subscribe the oath prescribed in Article seven of the Constitution. Said Secretary shall be ex-officio secretary of the State Board of Agriculture, and shall succeed to all the powers and duties now conferred by law upon the secretary of said Board.

Section 2. That it shall be the duty of the Secretary of Agriculture in such ways as he may deem fit and proper, to encourage and promote the development of agriculture, horticulture, forestry and kindred industries; to collect and publish statistics and other information in regard to the agricultural industries and interests of the State; to investigate the adaptability of grains, fruits, grasses and other crops to the soil and climate of the State, together with the diseases to which they are severally liable and the remedies therefor; to obtain and distribute information on all matters relating to the raising and care of stock and poultry; the best methods of producing wool and preparing the same for market, and shall diligently prosecute all such similar inquiries as may be required by the agricultural interests of the State and as will best promote the ends for

which the Department of Agriculture is established. He shall give special attention to such questions relating to the valuation and taxation of farm lands, to the variation and diversification in the kinds of crops and methods of cultivation, and their adaptability to changing markets as may arise from time to time, in consequence of a change of methods, means and rates of transportation, or in the habits or occupation of the people of this State and elsewhere, and shall publish as frequent as practicable, such information thereon as he shall deem useful. In the performance of the duties prescribed by this act, the Secretary of Agriculture shall, as far as practicable, make use of the facilities provided by the State Agricultural Experiment Station, the State Board of Agriculture and the various State and county societies and organizations maintained by agriculturists and horticulturists, whether with or without the aid of the State, and shall, as far as practicable, enlist the aid of the State Geological Survey for the purpose of obtaining and publishing useful information respecting the economic relations of geology to agriculture, forestry and kindred industries. He shall make an annual report to the Governor, and shall publish from time to time such bulletins of information as he may deem useful and advisable. Said report and bulletins shall be printed by the State Printer in the same manner as other public documents, not exceeding five thousand copies of any one bulletin.

Section 3. That it shall be the duty of the Secretary to obtain and publish information respecting the extent and condition of forest lands in this State, to make and carry out rules and regulations for the enforcement of all laws designed to protect forests from fires and from all illegal depredations and destruction, and report the same annually to the Governor, and as far as practicable, to give information and advice respecting the best methods of preserving wood lands and starting new plantations. He shall also, as far as practicable, procure statistics of the amount of timber cut during each year, the purpose for which it is used, and the amount of timber land thus cleared as compared with the amount of land newly brought under timber cultivation, and shall, in general, adopt all such measures as in his judgment may be desirable and effective for the preservation and increase of the timber lands of this State, and shall have direct charge and control of the management of all forest lands belonging to the Commonwealth, subject to the provisions of law relative thereto. The said Secretary shall also be and hereby is charged with the administration of all laws designed to prevent fraud or adulteration in the preparation, manufacture or sale of articles of food, the inspection, sale or transportation of agricultural products or imitations thereof, and all laws relating to diseases of

domestic animals, and to the manufacture and inspection of commercial fertilizers.

Section 4. There shall be one Deputy Secretary, who shall be appointed by the Governor for the term of four years, at a salary of three thousand dollars a year, who shall also be Director of Farmers' Institutes. The other officers of the Department shall be appointed by the Governor for the term of four years, and shall be an Economic Zoologist, (*a Commissioner of Forestry), a Dairy and Food Commissioner who shall have practical experience in the manufacture of dairy products, and a State Veterinarian who shall be a graduate of some reputable veterinary college, who shall receive an annual salary of twenty-five hundred dollars each. The Dairy and Food Commissioner shall, under the direction of the Secretary, perform the duties prescribed by an act approved May twenty-sixth, one thousand eight hundred and ninety-three. The Governor is hereby authorized to appoint one chief clerk of the Department at an annual salary of sixteen hundred dollars, one stenographer at a salary of eight hundred dollars a year, and one messenger at a salary of six hundred dollars a year, and the Dairy and Food Commissioner, the Commissioner of Forestry and the Economic Zoologist shall each have a clerk, who shall be appointed by the Governor, and who shall serve under the direction of the respective commissioners aforesaid, and receive a salary of fifteen hundred dollars a year each.

Section 5. That it shall be the duty of the Superintendent of Institutes to arrange them in such manner as to time and places of holding the same, as to secure the greatest economy and efficiency of service, and to this end he shall in each county where such institutes are to be held, confer and advise with the local member of the State Board of Agriculture, together with representatives duly appointed by each county agricultural, horticultural and other like organizations with reference to the appointment of speakers and other local arrangements.

Section 6. That the Secretary may at his discretion employ experts for special examinations or investigations, the expenses of which shall be paid by the State Treasurer in the same manner as like expenses are provided by law, but not more than five thousand dollars shall be so expended in any one year. In his annual report to the Governor, he may include so much of the reports of other organizations as he shall deem proper, which shall take the place of the present agricultural reports, and of which thirty-one thousand, six hundred copies shall be published and distributed as follows: To the Senate, nine thousand copies; to the House of Representatives, twenty thousand copies; to the Secretary of Agriculture, two thousand copies; to the State Librarian, for distribution among public

*Abolished by act of Legislature of 1901 establishing a Department of Forestry.

libraries and for reserve work, five hundred copies, and to the State Agricultural Experiment Station, one hundred copies.

Section 7. That the Secretary of Agriculture shall have an office at the State Capitol, and it is hereby made the duty of the Commissioners of Public Buildings and Grounds to provide the necessary rooms, furniture and apparatus for the use of the Department.

Section 8. That all acts or parts of acts inconsistent herewith be and the same are hereby repealed.

Approved—March 13, 1895.

LIST OF PUBLICATIONS OF THE PENNSYLVANIA DEPARTMENT OF AGRICULTURE.

ANNUAL REPORTS.

- *Report of the State Board of Agriculture, 336 pages, 1877.
- *Report of the State Board of Agriculture, 625 pages, 1878.
- *Report of the State Board of Agriculture, 560 pages, 1879.
- *Report of the State Board of Agriculture, 557 pages, 1880.
- *Report of the State Board of Agriculture, 646 pages, 1881.
- *Report of the State Board of Agriculture, 645 pages, 1882.
- *Report of the State Board of Agriculture, 645 pages, 1883.
- *Report of the State Board of Agriculture, 648 pages, 1884.
- *Report of the State Board of Agriculture, 645 pages, 1885.
- *Report of the State Board of Agriculture, 646 pages, 1886.
- *Report of the State Board of Agriculture, 650 pages, 1887.
- *Report of the State Board of Agriculture, 648 pages, 1888.
- *Report of the State Board of Agriculture, 650 pages, 1889.
- *Report of the State Board of Agriculture, 594 pages, 1890.
- *Report of the State Board of Agriculture, 600 pages, 1891.
- *Report of the State Board of Agriculture, 604 pages, 1892.
- *Report of the State Board of Agriculture, 713 pages, 1893.
- *Report of the State Board of Agriculture, 646 pages, 1894.
- *Report of the Department of Agriculture, 878 pages, 1895.
- Report of the Department of Agriculture, Part 1, 820 pages, 1896.
- Report of the Department of Agriculture, Part 2, 444 pages, 1896.
- *Report of the Department of Agriculture, Part 1, 897 pages, 1897.
- *Report of the Department of Agriculture, Part 2, 309 pages, 1897.
- Report of the Department of Agriculture, 894 pages, 1898.
- Report of the Department of Agriculture, Part 1, 1082 pages, 1899.
- Report of the Department of Agriculture, Part 2, 368 pages, 1899.
- Report of the Department of Agriculture, Part 1, 1010 pages, 1900.
- Report of the Department of Agriculture, Part 2, — pages, 1900.

*Note.—Edition exhausted.

BULLETINS.

- No. 1.* Tabulated Analyses of Commercial Fertilizers, 24 pages, 1895.
- No. 2.* List of Lecturers of Farmers' Institutes, 36 pages, 1895.
- No. 3.* The Pure Food Question in Pennsylvania, 38 pages, 1895.
- No. 4.* Tabulated Analyses of Commercial Fertilizers, 22 pages, 1896.
- No. 5.* Tabulated Analyses of Commercial Fertilizers, 38 pages, 1896.
- No. 6.* Taxidermy; How to Collect Skins, etc., 128 pages, 1896.
- No. 7.* List of Creameries in Pennsylvania, 68 pages, 1896.
- No. 8.* Report of State Horticultural Association, 108 pages, 1896.
- No. 9.* Report of Dairymen's Association, 96 pages, 1896.
- No. 10.* Prepared Food for Invalids and Infants, 12 pages, 1896.
- No. 11.* Tabulated Analyses of Commercial Fertilizers, 22 pages, 1896.
- No. 12.* Road Laws for Pennsylvania, 42 pages, 1896.
- No. 13.* Report of Butter Colors, 8 pages, 1896.
- No. 14.* Farmers' Institutes in Pennsylvania, 92 pages, 1890.
- No. 15. Good Roads for Pennsylvania, 42 pages, 1896.
- No. 16. Dairy Feeding as Practiced in Pennsylvania, 126 pages, 1896.
- No. 17.* Diseases and Enemies of Poultry, 128 pages, 1896.
- No. 18.* Digest of the General and Special Road Laws for Pennsylvania, 130 pages, 1896.
- No. 19. Tabulated Analyses of Commercial Fertilizers, 40 pages, 1896.
- No. 20.* Preliminary Report of Secretary, 126 pages, 1896.
- No. 21. The Township High School, 24 pages, 1897.
- No. 22.* Cider Vinegar in Pennsylvania, 28 pages, 1897.
- No. 23.* Tabulated Analyses of Commercial Fertilizers, 31 pages, 1897.
- No. 24.* Pure Food and Dairy Laws of Pennsylvania, 19 pages, 1897.
- No. 25.* Farmers' Institutes in Pennsylvania, 8 pages, 1897.
- No. 26. Farmers' Institutes in Pennsylvania, 74 pages, 1897.
- No. 27. The Cultivation of American Ginseng, 23 pages, 1897.
- No. 28. The Fungous Foes of the Farmer, 19 pages, 1897.
- No. 29. Investigations in the Bark of the Tree, 17 pages, 1897.

- No. 30. Sex in Plants, 17 pages, 1897.
- No. 31. The Economic Side of the Mole, 42 pages, 1898.
- No. 32.* Pure Food and Dairy Laws, 30 pages, 1898.
- No. 33.* Tabulated Analyses of Commercial Fertilizers, 42 pages, 1898.
- No. 34.* Preliminary Report of the Secretary, 150 pages, 1898.
- No. 35. Veterinary Medicines, 23 pages, 1898.
- No. 36.* Constitutions and By-Laws, 72 pages, 1898.
- No. 37.* Tabulated Analyses of Commercial Fertilizers, 40 pages, 1898.
- No. 38.* Farmers' Institutes in Pennsylvania, 8 pages, 1898.
- No. 39.* Farmers' Institutes in Pennsylvania, 88 pages, 1898.
- No. 40. Questions and Answers, 206 pages, 1898.
- No. 41. Preliminary Reports of the Department, 189 pages, 1899.
- No. 42.* List of Creameries in Pennsylvania, 88 pages, 1899.
- No. 43. The San Jose Scale and other Scale Insects, 22 pages, 1899.
- No. 44. Tabulated Analyses of Commercial Fertilizers, 62 pages, 1899.
- No. 45. Some Harmful Household Insects, 13 pages, 1899.
- No. 46. Some Insects Injurious to Wheat, 24 pages, 1899.
- No. 47. Some Insects Attacking Fruit, etc., 19 pages, 1899.
- No. 48. Common Cabbage Insects, 14 pages, 1899.
- No. 49. Method of Protecting Crops, etc., 20 pages, 1899.
- No. 50. Pure Food and Dairy Laws of Pennsylvania, 33 pages, 1899.
- No. 51. Tabulated Analyses of Commercial Fertilizers, 69 pages, 1899.
- No. 52.* Proceedings Spring Meeting of Board of Agriculture, 296 pages, 1899.
- No. 53. Farmers' Institutes in Pennsylvania, 1899-1900, 94 pages, 1899.
- No. 54. Tabulated Analyses of Commercial Fertilizers, 163 pages, 1899.
- No. 55. The Composition and Use of Fertilizers, 126 pages, 1899.
- No. 56. Nursery Fumigation and the Construction and Management of the Fumigating House, 24 pages, 1899.
- No. 57. The Application of Acetylene Illumination to Country Homes, 85 pages, 1899.
- No. 58. The Chemical Study of the Apple and Its Products, 44 pages, 1899.
- No. 59. Fungous Foes of Vegetable Fruits, 39 pages, 1899.
- No. 60. List of Creameries in Pennsylvania, 33 pages, 1899.
- No. 61. The Use of Lime on Pennsylvania Soils, 170 pages, 1900.

No. 62. A Summer's Work Abroad in School Grounds, Home Grounds, Play Grounds, Parks and Forests, 34 pages, 1900.

No. 63. A Course in Nature Study for Use in the Public Schools, 119 pages, 1900.

No. 64. Nature Study Reference Library for Use in the Public Schools, 22 pages, 1900.

No. 65. Farmers' Library List, 29 pages, 1900.

No. 66. Pennsylvania Road Statistics, 98 pages, 1900.

No. 67. Methods of Steer Feeding, 14 pages, 1900.

No. 68. Farmers' Institutes in Pennsylvania, 90 pages, 1900.

No. 69. Road Making Materials of Pennsylvania, 104 page, 1900.

No. 70. Tabulated Analyses of Commercial Fertilizers, 97 pages, 1900.

No. 71. Consolidation of Country Schools and the Transportation of the Scholars by Use of Vans, 89 pages, 1900.

No. 72. Tabulated Analyses of Commercial Fertilizers, 170 pages, 1900.

THE PENNSYLVANIA STATE AGRICULTURAL SOCIETY.

OFFICERS AND COMMITTEES FOR 1901.

PRESIDENT.

Hiram Young, York.

FIRST VICE PRESIDENT.

C. H. Bergner, Harrisburg.

VICE PRESIDENTS.

1. George A. Vare, Philadelphia.
2. William H. Wanamaker, Philadelphia.
3. Benjamin S. Kunkle, Philadelphia.
4. Charles E. Voorhees, Philadelphia.
5. A. J. Cassatt, Philadelphia.
6. David Y. Wilson, Gum Treee.
7. Robert E. Pattison, Philadelphia.
8. William T. Hildrup, Analomink.
9. George D. Stitzel, Reading.
10. Amos H. Mylin, Lancaster.
11. A. P. Young, Millville.
12. H. H. Colvin, Dalton.
13. A. D. Hay, Pottsville.
14. C. H. Bergner, Harrisburg.
15. Louis Piollet, Wysox.
16. Joel A. Herr, Cedar Springs.
17. Samuel Berkinbine, Northumberland.
18. Henry C. Chisolm, Huntingdon.
19. N. B. Critchfield, Critchfield.
20. Geo. F. Huff, Pittsburg.
21. Joseph Speer, Pittsburg.
22. J. D. Kirkpatrick, North Liberty.
23. J. C. Thornton, Fairview.
24. William Powell, Springboro.
25. Harry Hayward, State College.
26. Daniel H. Hastings, Bellefonte.
27. Jos. C. Sibley, Meadville.
28. John Curwen, M. D., Warren.

AT LARGE.

William A. Stone, Harrisburg.
 John Hamilton, State College.

ADDITIONAL MEMBERS EXECUTIVE COMMITTEE.

Levi G. McCauley,	West Chester.
*S. B. Rutherford,	Harrisburg.
Thos. M. Jones,	Harrisburg.
S. F. Barber,	Harrisburg.
J. P. Nissley,	Hummelstown.

CORRESPONDING AND RECORDING SECRETARY.

J. P. Nissley,	Hummelstown.
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TREASURER.

W. F. Rutherford,	Harrisburg.
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CHEMIST AND GEOLOGIST.

Hugh Hamilton,	Harrisburg.
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LIBRARIAN.

*William H. Egle,	Harrisburg.
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COMMITTEE OF ARRANGEMENTS.

Hiram Young,	York.
J. P. Nissley,	Hummelstown.
D. Y. Wilson,	Gum Tree.
W. F. Rutherford,	Harrisburg.
C. H. Bergner,	Harrisburg.

COMMITTEE ON LEGISLATION.

Chas. E. Voorhees,	Philadelphia.
C. H. Bergner,	Harrisburg.
Levi G. McCauley,	West Chester.
T. M. Jones,	Harrisburg.
J. P. Nissley,	Hummelstown.

COMMITTEE ON LOCATION.

Hiram Young,	York.
J. P. Nissley,	Hummelstown.
C. H. Bergner,	Harrisburg.
Louis Piollet,	Wysox.
W. F. Rutherford,	Harrisburg.

COMMITTEE ON PRINTING.

Wm. A. Stone,	Harrisburg.
A. H. Mylin,	Lancaster.
D. Y. Wilson,	Gum Tree.

Since deceased.

ACT TO INCORPORATE THE PENNSYLVANIA STATE AGRICULTURAL SOCIETY.

Through the efforts of a number of prominent men of Pennsylvania in the year 1851, the following statute was passed by the law-making power of the State:

An Act to incorporate the Pennsylvania State Agricultural Society.

Section 1. Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same, That George W. Woodward, James Irvin, E. A. Thompson, Frederick Watts, T. J. Bingham and others, who have subscribed the constitution lately adopted by a convention assembled at Harrisburg, to improve the condition of agriculture, horticulture and the household arts, be and they are hereby created a body politic and corporate in law, by the name of "The Pennsylvania State Agricultural Society," and by that name shall have perpetual succession, and have capacity to sue and to be sued, and may have a common seal, which at their pleasure may alter or renew; they may take by gift, grant, devise, bequest or otherwise, lands and tenements, goods and chattels, necessary for all the purposes for which the society was instituted: Provided, The annual income therefrom shall not exceed ten thousand dollars, independent of annual contributions by members, and the same to convey, lay out, apply and dispose of, for the benefit of the said society, as they under their charter and by-laws may direct.

Section 2. That the members of the said corporation shall have power to make and enforce such constitution and by-laws as may be necessary for the good government of the society, and the same from time to time to revoke, alter and amend, as they may think proper: Provided, That the same shall not be inconsistent with the Constitution and laws of this State.

Section 3. That the sum of two thousand dollars, out of any money in the treasury not otherwise appropriated, be and the same is hereby appropriated to the said society; and annually hereafter a sum of equal amount to that paid by the members thereof into its treasury, affidavit of which fact, and the amount so raised by the treasurer of the society, being first filed with the State Treasurer: Provided, Such sum shall not exceed two thousand dollars in any one year.

Section 4. That when any number of individuals shall organize themselves into an agricultural or horticultural society, or any agricultural or horticultural society now organized within any of the counties of this Commonwealth shall have adopted a constitution and by-laws for their government, elected their officers, and raised annually, by the voluntary contributions of its members, any sum of money, which shall have been actually paid into their treasury, for the purpose of being disbursed for the promotion of agricultural knowledge and improvement, and that fact be attested by the affidavit of their president and treasurer, filed with the commissioner of the county, the said society shall be entitled to receive annually a like sum from the treasurer of their said county: Provided, That said annual payment out of the county funds shall not exceed one hundred dollars: Provided further, That but one such society in any county shall be entitled to receive such appropriation in any one year, under this act.

Section 5. That the president of the Pennsylvania State Agricultural Society, who shall receive or expend any of the moneys hereby appropriated, shall annually, on the first Monday of January, transmit to the Governor of the Commonwealth a detailed account of the expenditures of all the moneys which shall come into his hands under this act, and stating to whom and for what purpose paid; and a copy of the said report shall be transmitted to the legislature at as early a day as practicable, and the original shall be filed in the office of the Secretary of the Commonwealth. And the presidents of the several county agricultural societies shall annually transmit, in the month of December, to the executive committee of the Pennsylvania State Agricultural Society, all such reports or returns as they are required to demand and receive from applicants for premiums, together with an abstract of their proceedings during the year. This act shall at all times be within the power of the Legislature to modify, alter or repeal the same.

JOHN CESSNA,

Speaker of the House of Representatives.

BENJAMIN MATTHIAS,

Speaker of the Senate.

Approved—The twenty-ninth day of March, Anno Domini one thousand eight hundred and fifty-one.

WM. F. JOHNSON.

CONSTITUTION AND BY-LAWS OF THE PENNSYLVANIA STATE AGRICULTURAL SOCIETY.

Subsequently a constitution and by-laws were adopted by the Society, and from time to time amended until they are as follows:

NAME AND OBJECTS.

The name of the society shall be The Pennsylvania State Agricultural Society. The objects of this society are to foster and improve agriculture, horticulture, and the domestic and household arts.

WHO ARE MEMBERS.

Section 1. The society shall consist of all such persons as shall pay to the treasurer not less than two dollars, and annually thereafter not less than two dollars; and also, of honorary and corresponding members, the names of the members to be recorded by the secretary.

The officers of the county agricultural societies in this State, or delegations therefrom, shall be members ex-officio of this society.

The payment of twenty-five dollars shall constitute life membership, and exempt the members so contributing from all annual payments.

OFFICERS.

Section 2. The officers of this society shall be president, vice president from each congressional district, three-fourths of whom shall be practical agriculturists or horticulturists, a treasurer, a corresponding secretary, a recording secretary, a librarian, an agricultural chemist and geologist, and such assistants as the society may find essential to the transaction of its business; an executive committee, consisting of the above-named officers, and five additional members, with the ex-presidents of the society, all of whom shall be elected at the annual meeting in January by the qualified members of the society.

OF THE PRESIDENT.

Section 3. The president shall have a general superintendence of all the affairs of the society.

FIRST VICE PRESIDENT.

That at the annual election of this society there shall be elected from one of the number of vice presidents, one of said officers to act

as first vice president, whose duty it shall be to act as president in case of absence or the death of the president.

EX-PRESIDENTS.

That whenever the number of ex-presidents exceeds five (5), the name receiving the lowest number of votes shall be the one dropped from the list of officers.

OF THE VICE PRESIDENTS.

It shall be the duty of the vice presidents to take charge of the affairs of the association in their several districts; to advance all its objects; to call upon farmers to report as to the condition of agriculture in their neighborhood; to ask for information as to the modes of cultivation adopted by different farmers; and, as far as in their power, to make known the resources of their districts, the nature of its soil, its geological character, and all such matter as may interest farmers in every part of the State.

TREASURER.

The treasurer shall keep an account of all moneys paid into his hands, and shall pay bills when audited and approved by the executive committee. Each order for payment must be signed by the president or chairman of the executive committee.

CORRESPONDING SECRETARY.

The duty of this officer shall be to invite a correspondence with all persons interested in agriculture, whether in the State of Pennsylvania or elsewhere, but especially with our consuls in foreign countries, that new seeds, vegetables, or live stock may be introduced and their fitness for cultivation and propagation in our climate be tested. At each stated meeting of the society, he shall read his correspondence, which shall, either the whole, or such parts as may be selected by the society, form a portion of the transactions. He shall also correspond with the president or other officers of each state society in the United States, at least twice in the year, for the purpose of combined and mutual action, and to be informed of the results and progress of each other's efforts; also, to invite mechanics to forward models or implements for examination or trial.

RECORDING SECRETARY.

The recording secretary shall keep the minutes of the society and of the executive committee. At the close of each year he shall prepare for publication such parts of the minutes and transactions of the society as may be designated.

The recording secretary shall have power to approve of such bills and contracts as he is authorized to make, and the treasurer shall pay the same.

LIBRARIAN.

The librarian shall take charge of all books, pamphlets, etc., belonging to the society, and shall act as a curator to preserve seeds, implements, or whatever property the society may possess.

In case of the death of any of the officers of this society, the president shall have power to fill the vacancy by appointment until the next annual meeting of the society.

EXECUTIVE COMMITTEE AND QUORUM.

The executive committee shall transact the business of the society generally; shall superintend and direct the publication of such of the reports and transactions as they may deem proper, and shall designate the time and places for annual exhibitions, regulate the expenditures, examine all accounts, and keep such general charge of the affairs of the society as may best promote its interests.

They shall select their own chairman, and meet quarterly, and at any other time when convened by the president; five members shall form a quorum.

They shall call special meetings of the society when necessary.

ANNUAL MEETING OF THE SOCIETY AND QUORUM.

Section 4. The society shall meet annually, on the third Wednesday of January, at Harrisburg, when all the officers of the society, not otherwise appointed, shall be elected by ballot for the ensuing year, and until another election. The polls shall be opened at 10 A. M. and closed at 12 o'clock M., when the result of the election shall be announced. They shall also hold a general meeting at the time of the annual exhibitions, and special meetings whenever convoked by the executive committee.

Fifteen members shall form a quorum for the transaction of business, but no member in arrears shall be entitled to the privileges of the society.

QUALIFICATIONS OF VOTERS.

Section 5. No annual member hereafter shall be entitled to vote for the election of officers of the Pennsylvania State Agricultural Society unless he shall have been a member of the previous State fair, and in default of a State fair, then three months' previous membership shall be necessary.

Section 6. No one shall be eligible to office hereafter who has not obtained a right to vote under section five.

ALTERATIONS.

Section 7. This constitution may be altered or amended at the annual meetings in January by a vote of two-thirds of the members in attendance.

All amendments to the constitution, to be voted upon at the annual meeting of the society in January, must be submitted to the meeting of the executive committee in September preceding said annual meeting of the executive committee in September preceding said annual meeting.

As will be noted by the foregoing act of Assembly, constitution and by-laws, the Pennsylvania State Agricultural Society is not a stock company, and has no stockholders. Any person, on the payment of \$2, is an annual member, and any person paying \$25 at one time, immediately becomes a life member.

MEMBERS
OF THE
PENNSYLVANIA STATE BOARD OF AGRICULTURE
FOR THE YEAR 1901.

MEMBERS EX-OFFICIO.

Hon. WM. A. STONE, Governor.
GENERAL J. W. LATTA, Secretary of Internal Affairs.
DR. N. C. SCHAEFFER, Superintendent of Public Instruction.
DR. G. W. ATHERTON, President of the State College.
HON. E. B. HARDENBERGH, Auditor General.
PROF. JOHN HAMILTON, Secretary of Agriculture.

APPOINTED BY THE GOVERNOR.

Hon. H. A. Gripp, Tyrone, Blair County,Term Expires 1901
R. I. Young, Middletown, Dauphin County,Term expires 1902
Col. R. H. Thomas, Mechanicsburg, Cumberland County,Term expires 1903

APPOINTED BY THE STATE POULTRY ASSOCIATION.

Hon. Norris G. Temple, Pocopson, Pa.

ELECTED BY COUNTY AGRICULTURAL SOCIETIES.

	Term expires.
Adams, A. I. Weidner, Arendtsville,	1903
Allegheny, J. S. Burns, Clinton,	1903
Armstrong, S. S. Blyholder, Leechburg,	1902
Beaver, T. A. Clifton, McCleary,	1902
Bedford, W. C. Lutz, Bedford,	1902
Berks, H. G. McGowan, Geiger's Mills,	1904
Blair, F. Jaekel, Hollidaysburg,	1904
Bradford, L. Piolet, Wysox,	1904
Bucks, C. S. Balderston, Lahaska,	1902
Butler, W. H. H. Riddle, Butler,	1903
Cambria, H. J. Krumenacher, Nicktown,	1903
Cameron, W. W. Howard, Emporium,	1903
Carbon,	
Centre,	1900

Term expires.

Chester,	M. E. Conard,	West Grove,	1903
Clarion,	S. F. McClellan,	Knox,	1904
Clearfield,	J. W. Nelson,	Shawmut,	1903
Clinton,	J. A. Herr,	Cedar Springs,	1902
Columbia,	H. V. White,	Bloomsburg,	1903
Crawford,	M. W. Oliver,	Conneautville,	1904
Cumberland,	C. H. Mullin,	Mount Holly Springs,	1903
Dauphin,	S. F. Barber,	Harrisburg,	1903
Delaware,	J. Milton Lutz,	Llanerch,	1904
Elk,	Frank Simpson,	Ridgway,	1903
Erie,	H. H. Chaffee,	Lowville,	1904
Fayette,	J. M. Hantz,	Merrittstown,	1903
Forest,	C. A. Randall,	Tionesta,	1904
Franklin,	C. B. Hege,	Marion,	1902
Fulton,	R. M. Kendall,	McConnellsburg,	1904
Greene,	B. F. Herrington,	Waynesburg,	1904
Huntingdon,	G. G. Hutchison,	Warriors' Mark,	1903
Indiana,	S. M. McHenry,	Indiana,	1904
Jefferson,	J. Newton Kelly,	Grange,	1902
Juniata,	M. Rodgers,	Mexico,	1903
Lackawanna,	H. W. Northup,	Glenburn,	1903
Lancaster,	W. H. Brosius,	Fernglen,	1904
Lawrence,	Samuel McCreary,	Neshannock Falls,	1903
Lebanon,	H. C. Snavelly,	Lebanon,	1904
Lehigh,	J. L. Schreiber,	Hosensack,	1903
Luzerne,	John T. Phillips,	Dallas,	1902
Lycoming,	A. J. Kahler,	Hughesville,	1903
McKean,	Chas. N. Barrett,	Port Allegany,	1903
Mercer,	John T. Crill,	Mercer,	1902
Mifflin,	D. E. Notestine,	Lewistown,	1904
Monroe,	R. F. Schwarz,	Analomink,	1902
Montgomery,	J. Sexton,	North Wales,	1902
Montour,	J. K. Murray,	Pottsgrove,	1904
Northampton,	Wm. F. Beck,	Nazareth,	1903
Northumberland,	J. A. Eschbach,	Milton,	1903
Perry,	A. T. Holman,	Nekoda,	1904
Philadelphia,	E. Lonsdale,	Chestnut Hill,	1904
Pike,			
Potter,			1900
Schuylkill,	W. H. Stout,	Pine Grove,	1903
Snyder,	J. F. Boyer,	Mount Pleasant Mills,	1903
Somerset,	N. B. Critchfield,	Critchfield,	1904
Sullivan,	J. W. Rodgers,	Forks ville,	1903
Susquehanna,	C. W. Brodhead,	Montrose,	1904
Tioga,	F. E. Field,	Stonyfork,	1902
Union,	J. Newton Glover,	Vicksburg,	1902
Venango,	August Morck,	Oil City,	1904
Warren,	R. J. Weld,	Sugar Grove,	1904
Washington,	D. M. Pry,	Burgettstown,	1902
Wayne,	Warren E. Perham,	Niagara,	1904
Westmoreland,	M. N. Clark,	Claridge,	1904
Wyoming,	D. A. Knuppenberg,	Lake Carey,	1904
York,			1901

OFFICERS.

PRESIDENT.

Hon. William A. Stone, Governor, Harrisburg.

VICE PRESIDENTS.

Dr. M. E. Conard, West Grove.

C. W. Brodhead, Montrose.

R. J. Weld, Sugar Grove.

EXECUTIVE COMMITTEE.

Hon. W. A. Stone, Harrisburg.

M. N. Clark, Claridge.

A. J. Kahler, Hughesville.

H. G. McGowan, Geiger's Mills.

H. C. Snively, Lebanon.

W. H. Stout, Pine Grove.

W. F. Beck, Nazareth.

Jason Sexton, North Wales.

John Hamilton, Secretary, Harrisburg.

ADVISORY COMMITTEE.

John Hamilton, Secretary, Harrisburg.

M. N. Clark, Claridge.

H. G. McGowan, Geiger's Mills.

Wm. F. Beck, Nazareth.

Botanist, Thomas Meehan, Germantown.

Pomologist, Cyrus T. Fox, Reading.

Chemist, Dr. William Frear, State College.

Vet. Surgeon, Dr. Leonard Pearson, Philadelphia.

Sanitarian, Dr. Benjamin Lee, Philadelphia.

Microscopists and Hy- Dr. H. Leffman, Philadelphia.
gienists. Prof. C. B. Cochran, West Chester.

Entomologists, Prof. R. C. Scheidt, Lancaster.

Dr. H. Skinner, Philadelphia.

Ornithologist, Prof. W. A. Buckhout, ... State College.

Meteorologists, E. R. Demain, Harrisburg.

J. L. Heacock, Quakertown.

Mineralogist, Col. H. C. Demming, Harrisburg.

Apiarist, Prof. Geo. C. Butz, State College.

Geologist, Prof. Isaac A. Harvey, ... Beech Creek.

STANDING COMMITTEES.

LEGISLATION.

Jason Sexton, Chairman,North Wales.
A. J. Kahler,Hughesville.
G. G. Hutchison,Warriors' Mark.
Louis Piollet,Wysox.
M. E. Conard,West Grove.

CEREALS AND CEREAL CROPS.

A. I. Weidner, Chairman,Arendtsville.

ROADS AND ROAD LAWS.

H. C. Snavelly, Chairman,Lebanon.

FRUIT AND FRUIT CULTURE.

S. B. Heiges, Chairman,York.

DAIRY AND DAIRY PRODUCTS.

S. F. Barber, Chairman,Harrisburg.

FERTILIZERS.

Matthew Rodgers, Chairman,Mexico.

WOOL AND TEXTILE FIBRES.

Samuel McCreary, Chairman,Neshannock Falls.

LIVE STOCK.

Dr. M. E. Conrad, Chairman,West Grove.

POULTRY.

Norris G. Temple, Chairman,Pocopson.

FORESTS AND FORESTRY.

Dr. J. T. Rothrock, Chairman,Harrisburg.

APIARY.

Prof. Geo. C. Butz, Chairman,State College.

FLORI-CULTURE.

Edwin Lonsdale, Chairman,Chestnut Hill.

AN ACT ESTABLISHING THE STATE BOARD OF AGRICULTURE.

AN ACT

To Establish a State Board of Agriculture.

Section 1. Be it enacted, etc., That the Governor of the Commonwealth, the Secretary of Internal Affairs, the Superintendent of Public Instruction, the Auditor General, the President of the Pennsylvania State College, and one person appointed from or by each agricultural society in the State, entitled under existing laws to receive an annual bounty from the county, and three other persons appointed by the Governor, with the consent of the Senate, shall constitute the State Board of Agriculture.*

Section 2. One-third of the members appointed shall retire from office on the fourth Wednesday in January in each year, according to their several appointments. The vacancies thus occurring shall be filled in the same manner as above provided, and the persons thus appointed shall hold their office for three years from the expiration of the former term. Other vacancies may be filled in the same manner, for the remainder of the vacant term.

Section 3. The board shall meet at the capital of the State, at least once in each year, and as much oftener as may be deemed expedient. No member of said board shall receive compensation from the State, except for necessary personal expenses, when engaged in the duties of the board.

Section 4. They shall appoint, and prescribe the duties of a secretary of the board, who may receive a salary, not exceeding fifteen hundred dollars a year.

*Note.—Extracts from the law.

"That when any number of individuals shall organize themselves into an agricultural or horticultural society, or any agricultural or horticultural society now organized within any of the counties of this Commonwealth, shall have adopted a constitution and by-laws for their government, elected their officers, and raised annually, by the voluntary contributions of its members any sum of money which shall have been actually paid into their treasury, for the purpose of being disbursed for the promotion of agricultural knowledge and improvement, and that fact be attested by the affidavit of their president and treasurer, filed with the commissioners of the county, the said county society shall be entitled to receive annually a like sum from the treasurer of their said county: Provided, That said annual payment out of the county funds shall not exceed one hundred dollars: Provided further, That but one such society in any county, shall be entitled to receive such appropriation in any one year, under this act."—Section 4, Act No. 203, 1851.

"That there shall be but one member of the Board from any county in the State. That any county asking for representation in the Board must have an agricultural society which shall raise a sum of money each and every year, for the advancement of agriculture, so as to be entitled to an annual bounty on the conditions prescribed in the acts of 1851 and 1876."—From Rules of the Board.

Section 5. They shall investigate such subjects, relating to improvements in agriculture in the State, as they may find proper, and take, hold in trust, and exercise control over donations or bequests made to them for the promotion of agricultural and general interest of husbandry.

Section 6. They may prescribe forms for, and regulate returns from local agricultural societies, and furnish to the officers of each such blanks as they deem necessary to secure uniform and reliable statistics.

Section 7. They shall annually, on or before the fourth day of January in each year, by their president or secretary, submit to the General Assembly, a detailed report of their doings, with such recommendations and suggestions as the interests of agriculture may require.

Section 8. The secretary of the board shall, in each year, cause to be made and published, for distribution, as full an abstract of the returns from local societies as the board may deem useful.

Section 9. The secretary shall have a permanent office at the capital, under the control and supervision of the board, which shall be supplied and maintained at the expense of the State.

This act shall take effect on the fourth Wednesday of January next ensuing.

Approved—The 8th day of May, A. D. 1876.

JOHN F. HARTRANFT.

CERTIFICATE OF ELECTION TO MEMBERSHIP IN THE
STATE BOARD OF AGRICULTURE.

..... 190..

Office of the Agricultural Society.

.....County, Pa.

This will certify, That
of County of was this day
..... to represent this Society in the Pennsylvania State
Board of Agriculture, for the term of three years, commencing from
and on the fourth Wednesday of January, 190..; and that the said

Society was organized under, and has complied with the Acts of Assembly and rules of the Board of Agriculture, as above set forth.

(SEAL)....., President.

P. O. Address,

Attest:

.....

Secretary.

P. O. Address,

MINUTES OF THE ANNUAL MEETING OF THE PENNSYLVANIA STATE BOARD OF AGRICULTURE.

HELD AT HARRISBURG, PA., JANUARY 24 AND 25, 1900.

Wednesday Morning, January 24, 1900.

Board called to order at 10 A. M., Vice President Sexton in the chair. The roll call of members showed the following persons present:

A. I. Weidner, Arendtsville, Adams county; H. G. McGowan, Geiger's Mills, Berks county; J. K. Hockley, Emporium, Cameron county; M. E. Conard, West Chester, Chester county; J. A. Herr, Cedar Springs, Clinton county; H. V. White, Bloomsburg, Columbia county; S. F. Barber, Harrisburg, Dauphin county; G. G. Hutchison, Warrior's Mark, Huntingdon county; M. Rodgers, Mexico, Juniata county; H. C. Snavelly, Lebanon, Lebanon county; J. L. Schreiber, Hosensack, Lehigh county; A. J. Kahler, Hughesville, Lycoming county; F. L. Sherburne, East Smethport, McKean county; Jason Sexton, North Wales, Montgomery county; J. K. Murray, Pottsgrove, Montour county; Wm. F. Beck, Nazareth, Northampton county; J. E. Stephens, Acker, Perry county; E. Lonsdale, Chestnut Hill, Philadelphia county; W. H. Stout, Pine Grove, Schuylkill county; N. B. Critchfield, Critchfield, Somerset county; C. W. Brodhead, Montrose, Susquehanna county; F. E. Field, Stonyfork, Tioga county; J. Newton Glover, Vicksburg, Union county; R. J. Weld, Sugar Grove, Warren county; D. M. Pry, Burgettstown, Washington county; M. N. Clark, Claridge, Westmoreland county; S. B. Heiges, York, York county.

The Secretary announced that owing to the legal limitations of the terms of membership, vacancies existed in the counties of Adams, Allegheny, Bedford, Cambria, Cameron, Centre, Chester, Clearfield, Columbia, Cumberland, Dauphin, Fayette, Greene, Huntingdon, Jefferson, Juniata, Lackawanna, Lawrence, Lehigh, Lycoming, McKean, Northampton, Northumberland, Potter, Schuylkill, Snyder, Sullivan and Wyoming. He also announced that a vacancy existed in Washington county, owing to the death of Mr. McDowell.

The following three counties are not represented on the Board, namely: Carbon, Elk and Pike.

Upon motion a committee was appointed to wait upon the Governor, and invite him to meet with the Board at his convenience. The committee was composed of Messrs. G. G. Hutchison, H. C. Snively, C. W. Brodhead, H. A. Gripp and Matthew Rodgers.

The minutes of the preceding meeting were then read and approved.

Upon motion the following were appointed a Committee on Credentials: J. A. Herr, J. K. Murray, F. E. Field, S. R. Downing and M. N. Clark.

Upon motion the following gentlemen were appointed a Committee on Necrology: S. B. Heiges, M. N. Clark, S. R. Downing, Jason Sexton, J. A. Woodward and John Hamilton.

While waiting for the report of the Committee on Credentials, a paper by J. S. Burns, of Allegheny county, on "Live Stock in Western Pennsylvania," was read by Hon. Cyrus T. Fox, of Reading, Pa., Mr. Burns being unable to be in attendance. Discussion was participated in by Messrs. Pearson, Hutchison, Conard, Armsby, Hamilton and Snively.

The Committee appointed to wait upon the Governor reported that they had performed that duty, and that the Governor would be pleased to accept the invitation of the Board to be present during the afternoon session.

The Committee on Credentials presented their report, stating that the following gentlemen are entitled to membership in the Board:

Name.	P. O. Address.	County.	Term expires.
A. I. Weidner,	Arendtsville,	Adams,	1903
J. S. Burns,	Clinton,	Allegheny,	1903
W. H. H. Riddle,	Butler,	Butler,	1903
W. C. Lutz,	Bedford,	Bedford,	1903
H. V. White,	Bloomsburg,	Columbia,	1903
J. K. Hockley,	Emporium,	Cameron,	1903
C. H. Mullin,	Mt. Holly Springs,	Cumberland,	1903
R. H. Thomas,	Mechanicsburg,	Cumberland,	1903
Dr. M. E. Conard,	West Grove,	Chester,	1903
Norris G. Temple,	Pocopson,	Chester,	1903
B. F. Herrington,	Waynesburg,	Greene,	1901
G. G. Hutchison,	Warriors' Mark,	Huntingdon,	1903
J. Newton Kelly,	Brookville,	Jefferson,	1902
M. Rodgers,	Mexico,	Juniata,	1903
A. J. Kahler,	Hughesville,	Lycoming,	1903
Henry W. Northup,	Glenburn,	Lackawanna,	1903
John L. Schreiber,	Hosensack,	Lehigh,	1903
Chas. N. Barrett,	Pott Allegany,	McKean,	1903
Wm. A. Heinen,	Milton,	Northumberland,	1903
Wm. F. Beck,	Nazareth,	Northampton,	1903
John F. Boyer,	Mt. Pleasant Mills,	Snyder,	1903
D. M. Pry,	Burgettstown,	Washington,	1902
D. A. Knuipenberg,	Tunkhannock,	Wyoming,	1901
S. F. Barber,	Harrisburg,	Dauphin,	1903
W. H. Stout,	Pine Grove,	Schuylkill,	19 3

On motion of Mr. Herr they were elected as members of the Board of Agriculture, for the period stated.

The following persons were presented as delegates from the several counties, representing Agricultural Organizations:

DELEGATES.

Samuel Bream, Adams county.

W. F. Vallershamp, Union county, Farmers' Alliance.

E. H. Sloan, Columbia county.

Hiram Young, York county; D. Y. Wilson, Chester county; W. F. Rutherford, Dauphin county, State Agricultural Society.

Dr. S. P. Heilman, of Mount Gretna Exposition Society.

George D. Stetson, Cyrus T. Fox, H. G. McGowan, Agricultural and Horticultural Association of Berks county.

W. W. Griffin, Chillisquaque Grange No. 277.

A. P. Young, Millville, Columbia county, Grange No. 52, P. of H.

W. R. Barnhart, State Horticultural Association.

W. Addison Rinker, Northampton county, Grange No. 971.

On motion of Mr. Herr, the above delegates were elected to sit as advising members of this Board.

On motion of Mr. Clark, Mr. Barber, of Dauphin county, was admitted as a member, on condition that his credentials, which had been left at home, be filed with the Secretary.

On motion of Mr. Hutchison, the Board proceeded to the election of officers. The election of vice presidents was declared in order. The following gentlemen were then nominated: N. C. Schaeffer, F. E. Field and H. A. Gripp.

Mr. Hutchison moved that J. A. Herr be authorized to cast the ballot for the gentlemen named. Mr. Herr accordingly deposited the ballot, and the nominees were then declared elected.

The Board then proceeded to the nomination of an Executive Committee. The following gentlemen were named: Governor Wm. A. Stone, M. N. Clark, G. G. Hutchison, J. A. Herr, M. Rodgers, H. V. White, M. E. Conard, Jason Sexton and John Hamilton, Secretary. Upon motion, nominations for Executive Committee were closed, and Mr. Downing was directed to cast the ballot of the Board for the above gentlemen, who were then declared elected.

The Chairman then proceeded to call for the reports of the Standing Committees.

LEGISLATION.

Jason Sexton reported verbally and agreed to prepare a written report.

CEREALS AND CEREAL CROPS.

No response.

ROADS AND ROAD LAWS.

S. R. Downing made a verbal report.

FRUIT AND FRUIT CULTURE.

No response.

DAIRY AND DAIRY PRODUCTS.

S. F. Barber made a verbal report. Remarks were made by Messrs. Hutchison, Armsby, Hamilton, Field, Conard and Rodgers.

FERTILIZERS.

Matthew Rodgers made a verbal report.

WOOL AND TEXTLE FIBRES.

No response.

LIVE STOCK.

No response.

POULTRY.

C. W. Brodhead made verbal report.

FORESTS AND FORESTRY.

No response.

APIARY.

No response.

The Executive Committee then reported through its chairman, Mr. M. N. Clark, the following appointments for the year 1900:

"A meeting of the Executive Committee was held at the close of the morning session of the Board, January 24, 1900, and an organization effected by the election of M. N. Clark, Chairman, and H. V. White, Secretary. After careful consideration they recommended the following appointments:"

Advisory Committee: John Hamilton, Secretary, J. A. Herr, H. V. White and G. G. Hutchison.

Botanist, Thomas Meehan, Germantown.

Pomologist, Cyrus T. Fox, Reading.

Chemist, Dr. Wm. Frear, State College.

Veterinary Surgeon, Dr. Leonard Pearson, Philadelphia.

Sanitarian, Dr. Benj. Lee, Philadelphia.

Microscopists and Hygienists, Dr. Leffman, Philadelphia, and Prof. C. B. Cochran, West Chester.

Entomologists, Prof. R. C. Schiedt, Lancaster, and Dr. H. Skinner, Philadelphia.

Ornithologist, Prof. W. A. Buckhout, State College.

Meteorologists, E. R. Demain, Harrisburg, and J. L. Heacock, Germantown.

Mineralogist, Col. H. C. Demming, Harrisburg.

Apiarist, Prof. Geo. C. Butz, State College.

Geologist, Prof. Isaac A. Harvey, Beech Creek.

STANDING COMMITTEES.

LEGISLATION.

Jason Sexton, W. C. Norton, G. G. Hutchison, Col. R. H. Thomas and Dr. M. E. Conard.

CEREALS AND CEREAL CROPS.

A. I. Weidner, Chairman.

ROADS AND ROAD LAWS.

S. R. Downing, Chairman.

FRUIT AND FRUIT CULTURE.

Prof. S. B. Heiges, Chairman.

DAIRY AND DAIRY PRODUCTS.

S. F. Barber, Chairman.

FERTILIZERS.

Matthew Rodgers, Chairman.

WOOL AND TEXTILE FIBRES.

Hiram Young, Chairman.

LIVE STOCK.

Dr. M. E. Conard, Chairman.

POULTRY.

Norris G. Temple, Chairman.

FORESTS AND FORESTRY.

Dr. J. T. Rothrock, Chairman.

APIARY.

Prof. George C. Butz, Chairman.

FLORICULTURE.

Edwin Lonsdale, Chairman.

Under the head of new business, Mr. Herr moved that the Board hold a Summer meeting, the date to be fixed by the Advisory Committee, which was agreed to. Mr. Herr invited the Board to hold the Summer meeting at Lock Haven. Mr. Hutchison gave an invitation to meet at Tyrone, seconded by Mr. Gripp. A letter received from Mr. Riddle extended an invitation for the Board to meet at Butler. Before the result of the ballot was announced, Mr. Hutchison moved that Lock Haven be chosen as the place of next meeting, which was unanimously agreed to.

Adjourned to meet at 1.30 P. M.

Wednesday Afternoon, January 24, 1900.

Board called to order 1.30 P. M., Vice President F. E. Field in the chair.

The regular order of business as arranged on the programme was then taken up:

The first paper was by Hon. S. R. Downing, West Chester, Pa., entitled "Whether the Broad or the Narrow Way in the Business of Farming." The reading of the paper was followed by discussion by Mr. Sexton.

The next paper was by R. J. Weld, Sugar Grove, Pa., "Our Farm Garden."

At this time the Committee appointed to escort the Governor to the meeting, reported that they had called upon his Excellency, and that they had the pleasure of presenting him in person. The Governor was invited to take the chair, and made a brief address, which was very cordially received.

Auditor General McCauley was called for and addressed the Board. He made a few remarks, explaining his interest in the work of the Board.

A recess was then taken to afford opportunity for the members to meet the Governor. Upon reassembling, a vote of thanks was voted the Governor for his presence and excellent address.

Major Wells, of the Dairy and Food Division of the Department of Agriculture, was the next speaker. His paper was, "Farm Economics."

The next speaker was Dr. M. C. Ihlseng, of State College, Pa.; subject, "Geological Relations of Soils." Discussion on paper was participated in by Messrs. Armsby, Stout, Hamilton, Herr and Kahler.

In order to relieve the evening programme, which was crowded, the order of business was changed, and Norris G. Temple, of Pocopson, Pa., presented his paper, entitled "Progressive Poultry Raising."

Upon motion the Board adjourned to meet at 7.30 P. M.

Wednesday Evening, January 24, 1900.

The Board reassembled at 7.30 P. M., Vice President Dr. N. C. Schaeffer in the Chair.

The first paper was by H. V. White, Esq., of Bloomsburg, Pa., subject, "Proof Positive that an Investment in Sociability Will Yield a Profit to Every Farmer."

The next speaker was introduced by Dr. N. C. Schaeffer, Miss Louise Miller, of Cornell University, who gave a lecture upon "Nature Study in the Public Schools." A most interested discussion was participated in by Messrs. Hamilton, Armsby, Schaeffer, Stout, Conard, Martin and Heiges, after which a vote of thanks was tendered Miss Miller by the Board. Prof. Heiges then presented the following resolution: "Resolved, That we favor the introduction of Nature Study into the public schools in Pennsylvania," which was carried unanimously.

The next topic was then taken up. "Quick Growing Trees for Pennsylvania Forests," by Dr. J. T. Rothrock, State Commissioner of Forestry. Discussion followed by Messrs. Herr, Stout and Hutchison.

Adjourned to meet at 9 A. M., Thursday morning.

Thursday Morning, January 25, 1900.

The Board met at 9 A. M., Vice President H. A. Gripp in the chair.

The first paper was by Hon. A. L. Martin, Deputy Secretary of the Department of Agriculture, on "Agriculture, the Past and the Present." Prof. Heiges, after discussing the question, moved the following resolution: "Resolved, That the United States government establish free mail delivery for the rural districts as rapidly as possible," which was unanimously carried.

The next was an address by Dr. H. P. Armsby, Director of the State Experiment Station, on the "Education of the Farmer." Discussion by Messrs. Northup and Downing.

On motion of Mr. Downing, the following resolutions were presented:

"Resolved, That a special committee of five be appointed by the Chair to investigate the present condition and needs of Agricultural Education in all its branches in this Commonwealth.

Resolved, That this Committee be instructed to arrange for a conference upon this subject, at some suitable time and place, with representatives of the State Department of Agriculture, the Department of Public Instruction, the Pennsylvania State College, the State Grange, the State Farmers' Alliance, the Pennsylvania Dairy Union, and any other State agricultural organization desiring to be represented.

Resolved, That the Committee hereby provided for be empowered to represent the State Board of Agriculture in such conference and to join, in the name of the Board, in such subsequent action as may be agreed upon, reporting its conclusions and actions to the next succeeding meeting of the Board."

After discussion by Messrs. Sexton, Vallerschamp, Herr, Barnhart, Armsby and Mrs. Starr, the resolutions were unanimously adopted, and it was then moved that the following committee be appointed to carry them into effect: S. R. Downing, Chairman, West Chester; W. H. Brosius, Lancaster; M. N. Clark, Westmoreland; Edwin Lonsdale, Philadelphia, and R. J. Weld, Warren.

The next paper was by Edwin Lonsdale, of Philadelphia, entitled "Flori-culture as a Profession."

The Committee on Necrology then presented its report through its chairman, Prof. S. B. Heiges. The report was, after remarks by Prof. Heiges, Hamilton, Herr and Clark, adopted by a rising vote, and directed to be spread upon the minutes, and is as follows:

"Whereas, An All-wise God in his inscrutable providence has seen fit to remove from our midst John McDowell, of Washington coun-

ty, for many years a member of the State Board of Agriculture, and President of the Pennsylvania Agricultural Society; therefore, be it

Resolved, That as members of the State Board, we miss his genial presence, wise and consistent advice, and vast fund of useful knowledge gained by a long life of careful observation and experience.

Resolved, That we sympathize with the bereaved members of his family in this, their irreparable loss, and are consoled by the belief that he has been called to reap the rewards of a well spent life.

Resolved, That a copy of these resolutions be forwarded by the Secretary of the State Board of Agriculture to his family as a meagre memento of our sincere sympathy and appreciation of his invaluable services to the State.

(Signed)

S. B. HEIGES, Chairman.

M. N. CLARK,

S. R. DOWNING,

J. A. HERR,

JASON SEXTON,

JOHN HAMILTON.

Mr. Hutchison hereupon made a few remarks for the Committee on Legislation, giving an account of the enactment of the laws governing the manufacture and sale of oleomargarine, renovated butter, etc. Discussion followed by Messrs. Murray, Clark and Herr.

Mr. Field was then recognized by the Chair, and discussed the new cheese law, claiming that it is practically nullified by the decision of the Attorney General in his decision of October 27th, 1897. The hour of adjournment having arrived the further discussion of this question was postponed until the afternoon session.

Adjourned to meet at 1.30 P. M.

Afternoon Session, January 25, 1900.

The Board reassembled at 1.30 P. M., Vice President Field in the Chair.

Mr. Clark, of Westmoreland, then moved that a new Standing Committee on Floriculture be appointed, and that Mr. Lonsdale, of Philadelphia, be chairman of this Committee. Carried.

The next paper on the programme was, "How to Take Care of Farm Implements," by J. T. Crill, of Mercer county. There being no response, the next subject was called for. "A Plea for Better Live Stock in Pennsylvania," by Harry Hayward, of State College, Pa. There being no response, the next subject was taken up. "The

Care of Horses' Feet and Teeth," by C. W. Brodhead, of Montrose, Pa. Discussion by Messrs. Hutchison, Hamilton, Hoover, Sharpless, Clark and Griffin.

The next paper was by W. H. Stout, of Pine Grove, Pa., "The Farmer as a Factor."

Mr. Field then resumed the floor which he had surrendered at the close of the morning session, and continued his address upon the cheese industry in Pennsylvania. Discussion by Messrs. Sharpless, Armsby, Hutchison, Hamilton, John Sharpless, Wells and Critchfield.

There being no further business, the Board adjourned *sine die*, to meet at the call of the Secretary.

JOHN HAMILTON,
Secretary.

Approved and adopted June 6, 1900.—J. H.

MINUTES OF THE MEETING OF THE STATE BOARD OF AGRICULTURE,

HELD IN THE COURT HOUSE IN LOCK HAVEN, JUNE 6, 1900.

The Board was called to order at 10 A. M. by the Secretary. In the absence of the President and Vice President, Dr. M. E. Conard, of Chester county, was elected President Pro Tem.

The minutes of the previous meeting were read, and approved.

The roll of members was then called, and the following persons answered to their names. Ex-officio members: N. C. Schaeffer, John Hamilton. Appointees of the Governor, S. R. Downing. Appointed by the State Poultry Association, Norris G. Temple. Elected by the county agricultural societies: A. I. Weidner, J. S. Burns, W. H. H. Riddle, J. J. Thomas, M. E. Conard, W. P. Henry, J. A. Herr, H. V. White, S. F. Barber, J. Milton Lutz, A. L. Wales, J. M. Hantz, C. B. Hege, W. C. Patterson, S. M. McHenry, Matthew Rodgers, H. W. Northup, W. H. Brosius, Samuel McCreary, A. J. Kahler, Charles N. Barrett, D. E. Notestine, Jason Sexton, J. K. Murray, William F. Beck, J. E. Stephens, J. W. Rodgers, C. W. Brodhead, F. E. Field, J. Newton Glover, W. J. Magee, R. J. Weld, D. M. Pry, M. N. Clark, D. A. Knuppenburg, S. B. Heiges and Louis Piolet.

The following Committee on Credentials was appointed: Joel A. Herr, M. N. Clark, Norris G. Temple, C. W. Brodhead and Jason Sexton.

His Honor, W. F. Elliott, Mayor of Lock Haven, was then introduced and welcomed the members and delegates, in a very cordial address.

Response was made by the Secretary.

The Committee on Credentials reported that they had examined the papers of members elect submittd to them, and recommended that the following persons be admitted to membership in the Board:

J. Milton Lutz, Upper Darby, Delaware Co.,Term expires 1901
 J. W. Rodgers, Forksville, Sullivan Co.,Term expires 1903
 Samuel McCreary, Neshannock Falls, Lawrence Co.,Term expires 1903

On motion, these gentlemen were admitted for the several terms mentioned.

The Committee further recommended that the following persons be admitted to sit as advisory members: Representing the State Agricultural Society, Hon. Hiram Young, W. H. Rutherford and Henry C. Demming; the Guernsey Cattle Club, John P. Sharpless; The Pennsylvania Live Stock Breeders' Association, E. S. Bayard; the Nittany Grange, W. H. Dornblaser; Clinton County Agricultural Society, I. C. Stover, H. F. Sweeley, T. J. Smull, W. E. Bower and J. A. Bitner; The Chillisquaque Grange, W. W. Griffin and D. P. Frederick. On motion, these delegates were admitted to the privileges of the floor.

Unfinished business was called for.

The committee appointed by the Board at its January meeting to arrange for a conference of the various agricultural organizations of the State, upon the condition of agricultural education in the State, reported through its chairman, Hon. Samuel R. Downing. Mr. Downing read the resolutions under which the committee was appointed. "Resolved, That a special committee of five be appointed by the Chair to investigate the present condition of agricultural education in all its branches in this Commonwealth.

"Resolved, That this committee be instructed to arrange for a conference upon this subject, at some suitable time and place, with representatives of the Department of Agriculture, the Department of Public Instruction, The Pennsylvania State College, The State Grange, The State Alliance, The Pennsylvania Dairymen's Union, and any other State agricultural organizations desiring to be represented."

The chairman reported that a meeting had been called for June 4 and 5 at The Pennsylvania State College, and that the following organizations were represented: The State Department of Agriculture, The State Board of Agriculture, The State Department of Public Instruction, The State Grange, The State Alliance, The State Agricultural Society, The State Horticultural Association, The Penn-

sylvania Dairy Union, The State Breeders' Association, The Guernsey Cattle Breeders' Association, The Pure Jersey Cattle Club, The State Poultry Association, and The Pennsylvania State College.

The conferees after full discussion unanimously adopted the following resolutions, being the report of its committee.

"Resolved, That it is the sense of this conference that Nature Study should be introduced into the public schools of the State.

"Resolved, That this conference request from the next Legislature an appropriation of \$10,000 per year, for two years, for The Pennsylvania State College, to defray the expenses of continuing the preparation and distribution to the teachers of the public schools of the State of bulletins and leaflets on nature study with special reference to agriculture.

"Resolved, That this conference urges the Legislature to provide for carrying into effect the act of June 28, 1895, providing for the establishment of township high schools.

"Resolved, That we request the State Legislature to make a sufficient appropriation for the erection and maintenance at The Pennsylvania State College, of a suitable building for the teaching of the different branches of agriculture, including dairying and forestry."

"Your committee further urges that the conference do not content itself with simply passing resolutions; but that if the above resolutions or any modifications of them, be adopted, proper measures be taken to inaugurate an active campaign in their behalf.

"Your committee accordingly recommends that a legislative committee of five members of the conference be appointed by the Chair to formulate and urge the legislation asked for by the conference.

"Your committee further recommends that each delegation be charged by the conference with the duty of presenting the matter to its organization, and securing the active support of that organization in the work of the Legislative Committee.

N. C. SCHAEFFER,
Chairman.

H. P. ARMSBY,
Secretary.

The Board, after hearing the report, on motion of Mr. Young, and seconded by Mr. Herr, adopted the following: "That it is the sense of the State Board of Agriculture, that the resolutions of the conference set forth the sentiments of this organization, and that the State Board hereby expresses their cordial approval of the purposes of the conference as outlined in the resolutions."

Dr. N. C. Schaeffer, one of the Vice Presidents, having arrived, was called to the chair.

On motion of Mr. Rodgers, of Juniata county, the following persons were appointed a committee to prepare resolutions upon the death of Hon. George E. Heyburn, member from Delaware county; Lutz, of Delaware; Rodgers of Juniata; Conard, of Chester; Sexton, of Montgomery, and Temple, of Chester.

Ex-Secretary Edge was called upon to speak to the Board upon the subject of "What He Saw of Farming in His Recent Trip Around the World."

Mr. Edge responded in a brief address, stating "that until he got to Italy he saw no agriculture." He continued, "we do not know what taxation is, or any other of the discomforts of farm life, as compared with any other country."

Hon. G. W. Koiner, Commissioner of Agriculture, of Virginia, was introduced by Secretary Hamilton to the Board, and was cordially received, and invited to sit as an advisory member.

Adjourned to meet at 1.30 P. M.

Wednesday Afternoon, June 6, 1900.

The Board was called to order at 1.30 P. M.

The regular order of exercises was then taken up.

The first paper was by Norris G. Temple, of Pocopson, Pa., on "The Breeding and Raising of Water Fowls."

The subject was discussed by Messrs. Smith, Northup, Hamilton, Sexton, Heiges, Clark, Herr, Peck, Thomas and Griffin.

The next paper was by Mr. R. J. Weld, of Sugar Grove, Pa., on "The Rotation of Crops." Discussion by Messrs. Glover, Rodgers, Phelps, Hantz, Hamilton, Clark, Barber, Quigley and Kahler.

The next paper on the programme was by R. F. Schwarz, of Analomink, Pa., on "The Restoration of Worn Out Soils." A letter was read by the Secretary from Mr. Schwarz, stating that he was laid up with a broken foot and could not be present, and had been prevented by his illness from preparing the paper.

The next paper was by C. W. Brodhead, of Montrose, Pa., on "Some Things Everyone Should Know that Owns or Handles a Horse." The paper was followed by a very interesting discussion, which was participated in by Messrs. Hamilton, Rodgers, Stoughton, Herr, Conrad, Heiges, Quigley, White, Edge, Kahler, Barber, Hall, Clark and Hantz.

Hon. G. W. Koiner, Commissioner of Agriculture of Virginia, was introduced and addressed the Board. After which the regular order of proceedings was resumed.

The next paper was by W. C. Patterson, of McConnellsburg, on "The Outlook." Discussion by Messrs Brosius and Agee.

The Secretary announced that a question box would be placed upon the desk, and all were invited to make use of it.

Mr. Riddle called attention to the organization of the State Live Stock Breeders' Association, at Pittsburg. Mr. Bayard, the Secretary of the organization, was introduced, and stated the object of the association, and invited all who were interested, to become members. He stated that the next meeting will be held in Harrisburg.

Hon. Alva Agee, of Ohio, was then introduced by Mr. Herr. He responded in a very interesting speech, and particularly commended the paper just read by Mr. Patterson.

Adjourned to meet at 7.30 P. M.

Evening Session, June 6, 1900.

The Board met at 7.30 P. M., Mr. Field in the Chair.

The Secretary presented the regrets of the Governor at not being able to be present at the meetings of the Board; the survivors of his old regiment were to meet in Gettysburg at this time, and he had agreed to attend before he knew of this meeting. He desired to express his interest in the objects and work of the Board, and his purpose to do all in his power to further its interests.

The regular programme was then taken up.

The first paper was by Hon. Jason Sexton, member from Montgomery, on "Our Wasted Resources."

Dr. J. T. Rothrock, Forestry Commissioner of Pennsylvania, then addressed the Board upon "The Relation of the State Forestry Reservations to the Commonwealth." Discussion by Messrs. Gardner and Hiester.

The next was a paper by W. A. Gardner of Andrews Settlement, on "Organization".

The next paper was by W. H. H. Riddle, of Butler, entitled "The Agriculturalist".

Mr. F. E. Field, of Stonyfork, then addressed the Board upon "Cheese Making and By-Products."

Hon. Jason Sexton was called to the Chair during the delivering of this address.

Discussion by Messrs. Northup, Sexton, Heiges, Phelps, Edge, Wales and Koiner.

On motion of Mr. Thomas, of Cambria, seconded by Mr. Herr, the following resolutions were adopted.

"Whereas, There is reason to suspect that impure and unadulterated cattle food is being sold in this State, entailing injury and loss to both the producers and consumers of feeding stuffs; and

"Whereas, The Agricultural Department of Pennsylvania has taken measures to investigate the matter, and, if necessary, endeavor to procure such legislation as will protect the people of the State from such imposition; therefore,

"Resolved, That this State Board of Agriculture heartily endorses this action of the Department, and pledges its aid in procuring remedial legislation, if the investigation of the subject, now being made by the Department, shows that legislation is necessary."

After discussion, it was decided that the Committee upon the death of Hon. G. E. Heyburn, prepare its report and file it with the Secretary, to be spread upon the minutes of the Board.

The Board adjourned to meet in Harrisburg, January 23 and 24, 1901.

JOHN HAMILTON,
Secretary.

PENNSYLVANIA FARMERS' INSTITUTES.

COUNTY CHAIRMEN.

SEASON OF 1899-1900.

County.	Name.	Place.
Adams,	A. I. Weidner,	Arendtsville.
Allegheny,	J. S. Burns,	Clinton.
Armstrong,	S. S. Blyholder,	Leechburg.
Beaver,	Thomas A. Clifton,	Beaver.
Bedford,	D. Holderbaum,	Bedford.
Berks,	H. G. McGowan,	Geiger's Mills.
Blair,	H. L. Harvey,	Duncansville.
Bradford,	L. Piolet,	Wysox.
Bucks,		
Butler,	W. H. H. Riddle,	Butler.
Cambria,	J. J. Thomas,	Carrolltown.
Cameron,	J. K. Hockley,	Emporium.
Carbon,	J. A. Werner,	Weatherly.
Centre,	John A. Woodward,	Howard.
Chester,	Dr. M. E. Conard,	West Grove.
Clarion,	G. T. Henry,	Piolet.
Clearfield,	A. Judson Smith,	New Millport.
Clinton,	Joel A. Herr,	Cedar Springs.
Columbia,	H. V. White,	Bloomsburg.
Crawford,	M. W. Oliver,	Conneautville.
Cumberland,	R. H. Thomas,	Mechanicsburg.
Cumberland,	B. D. Biggs,	Shippensburg.
Dauphin,	S. F. Barber,	Harrisburg.
Delaware,		
Elk,	J. M. Wittman,	St. Mary's.
Erie,	A. L. Wales,	Corry.
Fayette,	J. M. Hantz,	Merrittstown.
Forest,	Chas. A. Randall,	Tionesta.
Franklin,	C. B. Hege,	Marion.
Fulton,	W. C. Patterson,	McConnellsburg.
Greene,	John H. Smith,	Nineveh.
Huntingdon,	G. G. Hutchison,	Warrior's Mark.
Indiana,	S. M. McHenry,	Indiana.
Jefferson,	J. N. Kelly,	Grange.
Juniata,	Matthew Rodgers,	Mexico.
Lackawanna,	H. W. Northup,	Glenburn.
Lancaster,	W. H. Brosius,	Fernglen.
Lawrence,	Samuel McCreary,	Neshannock Falls.
Lebanon,	H. C. Snively,	Lebanon.

County.	Name.	Place.
Lehigh,	J. L. Schreiber,	Hosensack.
Luzerne,	J. E. Hildebrandt,	Lehman.
Lycoming,	A. J. Kahler,	Hughesville.
McKean,	F. L. Sherburne,	East Smethport.
Mercer,	John T. Crill,	Mercer.
Mifflin,	D. E. Notestine,	Lewistown.
Monroe,	Randall Bisbing,	Minsi.
Montgomery,	Jason Sexton,	North Wales.
Montour,	J. K. Murray,	Pottsgrove.
Northampton,	Wm. F. Beck,	Nazareth.
Northumberland,	C. C. McWilliams,	Elysburg.
Perry,	J. E. Stephens,	Acker.
Philadelphia,	Edwin Lonsdale,	Chestnut Hill.
Pike,	J. K. Van Etten,	Milford.
Potter,	W. A. Gardner,	Andrews' Settlement.
Schuylkill,	W. H. Stout,	Pine Grove.
Snyder,	J. F. Boyer,	Mt. Pleasant Mills.
Somerset,	N. B. Critchfield,	Critchfield.
Sullivan,	John W. Rodgers,	Forksville.
Susquehanna,	C. W. Brodhead,	Montrose.
Tioga,	F. E. Field,	Stonyfork.
Union,	J. N. Glover,	Vicksburg.
Venango,	W. J. Magee,	Oil City.
Warren,	R. J. Weld,	Sugar Grove.
Washington,	D. M. Pry,	Burgettstown.
Wayne,	W. C. Norton,	Aldenville.
Westmoreland,	M. N. Clark,	Claridge.
Wyoming,	Elmer Detrick,	Russell Hill.
York,	S. B. Heiges,	York.

LIST OF STATE SPEAKERS ENGAGED IN FARMERS' INSTITUTE WORK IN PENNSYLVANIA.

DURING SEASON OF 1899-1900.

Alva Agee, Cheshire, O.	M. N. Clark, Claridge.
J. W. Allison, Mercer.	L. A. Clinton, Ithaca, N. Y.
Dr. H. P. Armsby, State College.	M. E. Conard, West Grove.
S. F. Barber, Harrisburg.	Calvin Cooper, Bird-in-Hand.
R. L. Beardslee, Warrenham.	N. B. Critchfield, Critchfield.
W. M. Benninger, Benningers.	S. R. Downing, Goshenville.
M. S. Bond, Danville.	F. E. Field, Stonyfork.
S. S. Brockway, Greenville.	Dr. Wm. Frear, State College.
Prof. W. A. Buckhout, State College.	J. A. Fries, State College.
J. S. Burns, Clinton.	Luther Gates, Beaver Center.
Prof. Geo. C. Butz, State College.	Prof. J. M. Hantz, Merriittstown.

Harry Hayward, State College.	Henry W. Northrop, Glenburn.
S. P. Heilman, Heilmandale.	C. L. Peck, Coudersport.
Prof. S. B. Heiges, York.	D. H. Pershing, Stauffer.
Joel A. Herr, Cedar Springs.	J. B. Phelps, Conneautville.
Gabriel Hiester, Harrisburg.	Thos. J. Philips, Atglen.
Enos H. Hess, State College.	H. H. Russell, Belle Valley.
W. F. Hill, Westford.	Oliver D. Schock, Hamburg.
E. S. Hoover, Lancaster.	R. F. Schwarz, Analomink.
Geo. E. Hull, Orangeville, O.	R. S. Seeds, Birmingham.
W. A. Hutchison, State College.	Jason Sexton, North Wales.
J. B. Irons, Erie.	Frank Simpson, Ridgway.
Jasper T. Jennings, New Milford.	A. Judson Smith, New Millport.
J. B. Johnston, New Wilmington.	W. H. Stout, Pine Grove.
A. J. Kahler, Hughesville.	W. H. Thomson, State College.
L. W. Lighty, East Berlin.	C. W. Williams, Hillsville.
M. S. McDowell, State College.	J. M. Wittman, St. Mary's.
T. O. Milliken, Cornpropsts Mills.	Jno. A. Woodward, Howard.
Rev. J. T. Neel, Rice's Landing.	A. P. Young, Millville.
C. D. Northrop, Elkland.	

SUPPLEMENTAL LIST OF LECTURERS.

INSTITUTE SEASON OF 1899-1900.

James Q. Atkinson, Three Tuns.	Col. W. Penn Lloyd, Mechanicsburg.
Martin G. Benedict, State College.	Dr. J. M. Martin, Mercersburg.
Wm. M. Bigler, M. D., Tilden.	Col. Geo. Nox McCain, Philadelphia.
George Campbell, Green's Landing.	R. E. McDaniel, Springdale.
C. E. Chapman, Peruville, N. Y.	M. E. McDonnell, State College.
Prof. C. B. Cochran, West Chester.	John McDonald, Delhi, N. Y.
Joseph Crist, Critchfield.	Miss M. Alice Meyer, Clintondale.
Dr. J. P. Edge, Downingtown.	George A. Mitchell, Vineland, N. J.
William M. Ely, Solebury.	Frank N. Moore, North Orwell.
Abner Fague, Picture Rocks.	William L. Nesbit, Lewisburg.
L. J. Farmer, Pulaski, N. Y.	M. W. Oliver, Conneautville.
G. R. Foulke, West Chester.	Isaac Parry, Breadysville.
Dr. C. E. Goldsborough, Hunterstown.	Mrs. Mary S. Parry, Higbee.
John Gould, Aurora Station, O.	Jos. H. Paschall, Ward.
Dr. Geo. A. Groff, Lewisburg.	Geo. T. Powell, Ghent, N. Y.
George W. Hood, Indiana.	Joseph Beatty Powell, Shadeland.
W. Horace Hoskins, Philadelphia.	Anna E. Redifer, State College.
C. L. Hoyt, Horsehead, N. Y.	Mattie Reeder, New Hope.
G. G. Hutchison, Warriors' Mark.	Dr. M. P. Ravenel, Philadelphia.
W. B. K. Johnson, Allentown.	Mrs. Sarah Tyson Rorer, Philadelphia.
Helen Stowell Johnson, Corry.	Dr. N. C. Schaeffer, Harrisburg.
Florence R. Kenderdine, Lumberville.	Noah Seanor, Plumville.
W. H. Knouse, Swales.	R. S. Searle, Montrose.
John H. Landis, Millersville.	A. G. Seyfert, East Earl.
Rev. M. D. Lichliter, Pittsburg.	O. P. Shaver, Freidens.

John L. Shawver, Bellefontaine, O.	Emil Ulrich, Stroudsburg.
Robert M. Simmers, Phoenixville.	Prof. Geo. C. Watson, State College.
W. C. Sloan, Sloan.	Jas. A. Waugh, Pittsburg.
Wellington Smith, Mifflintown.	S. M. Wherry, Shippensburg.
T. B. Terry, Hudson, O.	J. S. Woodward, Lockport, N. Y.
Jacob Twining, Newtown.	

DEPARTMENT LECTURERS.

PROF. JOHN HAMILTON, Secretary of Agriculture.
HON. A. L. MARTIN, Director of Institutes.
MAJOR LEVI WELLS, Dairy and Food Commissioner.
BENJ. F. MacCARTNEY, Economic Zoologist.
DR. J. T. ROTHROCK, Commissioner of Forestry.
DR. LEONARD PEARSON, State Veterinarian.

APPORTIONMENT FOR THE SEASON OF 1900-1901.

In order that the boards of institute managers may have full information in regard to the plans of the Department, as to the institute work for the coming season, the following distribution of time for holding institutes is presented.

The apportionment shows the number of days that the Department will furnish at least two lecturers to each county, for institute work during the season of 1900-1901. It is made on the basis of two days of institute, to every county having not over 1,000 farms; three days to each county having more than 1,000 and not over 1,500; afterwards, one day for each 1,500 farms or fraction thereof additional. This insures Department aid to each county, in proportion to its agricultural interests.

The State has been divided into five sections. A separate set of lecturers will be assigned to each section, and in a given county, the same Department workers will continue until all the institutes in that county have been held.

The amount of money to be distributed to the various managers for local expenses, will be according to the number of days of institutes held. In order to make the amount ample for the coming season, the sum has been fixed at \$12.50 per day of institute. This provides \$25.00 for each two days of institute, to be used for local expenses, such as printing programmes, rent of halls, necessary expenses of local managers, etc.

There will be in addition, the State help of at least two lecturers, which, with the local assistance, ought to carry the work through in a creditable manner.

Past experience in most of the counties has shown that the two days' institute is much more economical and efficient than the one day meeting. In the one day meeting the time is usually given to the visiting lecturers to the exclusion of local aid, on the ground that the people wish to hear the strangers, and as there is not time to hear all, the visitors are given the preference. This is a serious mistake. The main object of the institute is the development of the local people, and whatever interferes with this, ought to be corrected. A two day institute gives ample time for all to be heard, and provides, also for the deliberate and full discussion of matters of interest that may arise. The morning session of the first day is almost always a failure, and ought to be dropped, and the institute begin at one P. M., and continued for five sessions. This gives time for the visiting lecturers to reach the ground, and begin the work with the advantage of a full house.

APPORTIONMENT FOR 1900-1901.

Section 1.		Section 2.		Section 3.		Section 4.		Section 5.	
COUNTY.	Days.	COUNTY.	Days.	COUNTY.	Days.	COUNTY.	Days.	COUNTY.	Days.
Adams,	5	Blair,	4	Allegheny,	6	Bradford,	8	Bucks,	7
Bedford,	5	Columbia,	5	Armstrong,	5	Clinton,	3	Berks,	7
Chester,	7	Centre,	4	Butler,	6	Clarion,	6	Carbon,	2
Cumberland,	4	Clearfield,	4	Beaver,	4	Cameron,	3	Delaware,	4
Fayette,	5	Cambria,	4	Crawford,	8	Elk,	3	Lehigh,	5
Franklin,	5	Dauphin,	4	Erie,	6	Forest,	3	Luzerne,	4
Fulton,	3	Huntingdon,	4	Greene,	4	Jefferson,	4	Lackawanna,	4
Juniata,	4	Indiana,	6	Lawrence,	4	Lycoming,	5	Montgomery,	6
Lancaster,	9	Lebanon,	4	Mercer,	6	McKean,	4	Monroe,	4
Perry,	4	Mifflin,	3	Venango,	4	Potter,	4	Northampton,	5
Somerset,	5	Montour,	2	Washington,	5	Sullivan,	2	Philadelphia,	3
York,	8	Northumberland,	4	Westmoreland,	5	Tioga,	6	Pike,	2
.....	.....	Schuylkill,	4	.....	.....	Warren,	4	Susquehanna,	6
.....	.....	Snyder,	4	.....	.....	Wyoming,	4	Wayne,	6
.....	.....	Union,	3	.....	.....	.....	.....	.....	.....
64		59		63		59		55	

DIRECTIONS FOR CONSTITUTING LOCAL COMMITTEES ON INSTITUTE WORK IN THE SEVERAL COUNTIES OF PENN- SYLVANIA.

The act of March 13, 1895 (Section 5), makes the following provisions: "That it shall be the duty of the Superintendent of Institutes to arrange them in such manner as to time and places of holding the same, as to secure the greatest economy and efficiency of service, and to this end he shall, in each county where such institutes are to be held, confer and advise with the local member of the State Board of Agriculture, together with the representatives duly appointed by each county agricultural, horticultural or other like organization, with reference to the appointment of speakers and other local arrangements."

In order to carry this provision of the law into effect, the Director of Institutes directs that these representatives, one from each county organization as stated, duly chosen and properly credited, together with the local member of the State Board of Agriculture, shall constitute a board of County Institute Managers, of which the local member of the State Board of Agriculture shall be the chairman. The organizations entitled to representation, are, county agricultural societies, county horticultural societies, Pomona Granges and county alliances.

The duty of this board shall be to confer and advise with each other and the Director of Institutes, with reference to the appointment of speakers and other local arrangements for holding institutes.

It shall be the duty of each county organization named, to notify the Director of Institutes of the appointment of its representative and at the same time give a similar notice to the local member of the State Board of Agriculture, if there is one in that county.

The local member of the State Board of Agriculture, together with these representatives of the county organizations, shall meet for organization on the second Tuesday of June in each year, at one o'clock P. M., in the county town, at the office of the county commissioners. At this meeting the places for holding institutes for the ensuing season shall be selected, the same to be subject to the approval of the Director of Institutes. An institute committee will also be appointed, at this time, for each locality in which institutes are to be held.

The local member of the State Board, and each duly accredited

representative of the county organization in attendance upon this meeting shall, upon the certificate of the chairman of the board of managers, be paid his expenses, not to exceed two dollars.

In these meetings every member shall have equal voice, and the action of the majority shall decide. Notice of the action of the board shall be sent by the chairman to the Director of Institutes, within ten days after the meeting.

In counties where the State Board of Agriculture has no member, or when he may for any reason decline to serve as member and chairman of the committee, the representative of the county organizations mentioned, shall elect a chairman and notify the Director of Institutes of the fact. Or, if after the meeting for organization the chairman does not call a second meeting of the committee at least sixty days prior to the date fixed for holding the first institute, then the other members shall meet and proceed to arrange for the institute, first notifying the Director of Institutes of their action.

In case no representative from any county organizations of that county shall appear in the meeting on the second Tuesday of June as stated, then the local member of the State Board of Agriculture shall immediately report the fact to the Director of Institutes and proceed to arrange for the holding of institutes that year, without further consultation with the local organizations.

All moneys allotted to any county for use in institute work will be paid to the chairman of the local committee, to be accounted for by him in an itemized statement, audited and signed by auditors appointed by the committee, and then forwarded to this Department, not later than the first day of May in each year.

SUGGESTIONS TO INSTITUTE MANAGERS.

Prepare programme at least thirty days before date of Institute.

Arrangements should be made with persons in your locality who are to take part, at least eight weeks previous to meeting.

Have a Question Box, and place it in charge of some competent person whose work will be to carefully conduct the same.

Exclude from Institutes all sectarian and partisan topics.

Print on programme the name of Chairman and members of Committees.

Thoroughly advertise the Institute by distributing programmes, invitation by postal cards and posters, and secure the aid and good will of your local newspaper.

Select a competent Secretary to take notes and report proceedings of meeting to local papers.

Invite representatives of newspapers to a place at Recording Secretary's table, and solicit their aid and assistance in reporting proceedings of meetings.

For a two-days' Institute, provide for five sessions, each session devoted to a certain topic, and have no local speaker crowded off programme for want of time, unless unavoidable.

Locate Institutes where a suitable hall or church can be procured and the greatest number can be accommodated, as these meetings are for the benefit of the farmers and their families.

Extend a personal invitation to your County Superintendent of Public Schools to be present and take part, especially at the educational session, without which no Institute is complete. Invite all farm organizations, all school teachers and children, especially the ladies, to attend and take part in the exercises.

At least three State speakers will be in attendance, and a list of topics which they are prepared to discuss can be found in the Institute Bulletin. From this list the Committee on Programme can select such topics as would most interest the farmers in their section, and place same opposite the lecturer's name on programme.

The County Chairman should, as soon as arrangements are completed for holding Institute, enclose to all lectures expected to be present, a copy of programme, with letter designating what railroad station to stop at, and the name of the hotel secured for their accommodation. In case Institute is held at a distance from railroad, speakers should be met by conveyance and taken to Institute. The expense of getting from and to such stations is to be paid by County Chairman.

Remember the Institute is for the whole county and not merely for the town or locality where held. Begin advertising early and do not fail to let the public know of your meeting.

The State is divided into five sections. Beginning December 3d, five institutes will be in session at the same time. At least three State speakers will be present at all Institutes. One State speaker will be a special representative of the Department and have charge of the section, and may be regarded as an assistant to the presiding officer in the performance of his duties.

It is important that the Chairman of County Board of Institute Managers make a complete report of his Institutes, and mail same to the Director of Institutes as soon as possible after the close of the Institutes. Blanks for this purpose will be forwarded him. All essays of merit, read before Institutes, should be collected by the County Chairman, and forwarded to the Director of Institutes. A

number of these essays are published in the annual report, and we regret that space forbids that all can not be published. In selecting essays for publication, we find numerous essays treating upon the same topic, all meritorious, yet space would forbid the publication of more than one essay upon a given topic. These papers are placed upon file and kept for future reference.

GENERAL ROUND-UP OF FARMERS' INSTITUTE MANAGERS AND LECTURERS,

HELD IN THE COURT HOUSE AT LOCK HAVEN, CLINTON COUNTY,
PENNSYLVANIA, JUNE 6, 7, 8, 1900.

PROGRAMME.

Thursday Morning, June 7, 1900.

Call to order at 8.30 A. M.

Adjournment on Motion.

Prof. S. B. Heiges, of York county, Chairman.

GENERAL FARMING SESSION.

1. "The Soil Our Partner,"

By Hon. Alva Agee, Cheshire, O.

2. "Soil Improvement, the Keynote of Agriculture,"

By R. S. Seeds, Esq., Birmingham, Huntingdon County, Pa.

3. "The Water Supply on the Farm and How to Get It,"

By Henry W. Northup, Glenburn, Lackawanna County, Pa.

4. "Feeding Cattle for Profit,"

By J. S. Burns, Esq., Clinton, Allegheny County, Pa.

5. "The Tidy vs. the Careless Farmer,"

By M. N. Clark, Esq., Claridge, Westmoreland County, Pa.

6. "Twentieth Century Farmer,"

By R. L. Beardslee, Esq., Warrenham, Bradford County, Pa.

7. "Ideal Standards in Farming,"

By George E. Hull, Esq., Orangeville, O.

8. "Pure Food Laws and Their Enforcement,"

By Major Levi Wells, State Dairy and Food Commissioner,
Harrisburg, Pa.

9. General discussion.

Thursday Afternoon, June 7th, 1900.

Call to order at 1.30 P. M.

Adjournment on motion.

Hon. S. R. Downing, Goshenville, Chester County, Chairman.

1. Written Reports of County Institute Managers.

2. Discussion.

COUNTRY HOME SESSION.

Thursday Evening, June 7, 1900.

Call to order at 7.30.

Adjournment on motion.

W. H. H. Riddle, Esq., of Butler County, Chairman.

Prayer.

PAPERS AND DISCUSSIONS.

1. "Nature Study in the Public Schools,"

By J. H. Peachy, Esq., Belleville, Mifflin County, Pa.

2. "Should Agriculture be Taught in Our Common Schools,"

By Gabriel Hiester, Esq., Harrisburg, Dauphin County, Pa.

3. "Botany on the Farm,"

By Prof. George C. Butz, State College, Centre County, Pa.

4. "Education vs. Ignorance in Modern Farming,"

By C. L. Peck, Esq., Coudersport, Potter County, Pa.

5. "Training for Our Life Work,"

By Enos H. Hess, Esq., State College, Centre County, Pa.

6. "Our Education, Our Capital,"

By W. F. Hill, Esq., Westford, Crawford County, Pa.

7. "Education for the Adult Farmer,"

Dr. William Frear, State College, Centre County, Pa.

8. "Plants for Home Adornment,"

By Edwin Lonsdale, Esq., Chestnut Hill, Philadelphia County, Pa.

9. "Practical Manner for Conducting Nature Study in Our Public Schools,"

By Prof. S. B. Heiges, York, York County, Pa.

Friday Morning, June 8, 1900.

Call to order at 8.30 A. M.

Adjournment on motion.

S. F. Barber, Esq., Harrisburg, Dauphin County, Chairman.

PAPERS AND DISCUSSIONS.

1. "The Silo, an Economic."

By Hon. T. J. Philips, Atglen, Chester County, Pa.

2. "Management of Dairy Cows on the Farm,"

By L. W. Lighty, Esq., East Berlin, Adams County, Pa.

3. "Farmers' Institutes, Past and Present,"

By Hon. S. R. Downing, Goshenville, Chester County, Pa.

4. "Nine Years with Crimson Clover,"

By Calvin Cooper, Esq., Bird-in-Hand, Lancaster County, Pa.

5. "The Relation of the Wholesomeness of the Stable to the Health of its Inmates,"

By Dr. Leonard Pearson, State Veterinarian, Philadelphia, Pa.

LIST OF QUESTIONS AND ASSIGNMENTS.

Friday Afternoon, June 8, 1900.

Call to order at 1.30 P. M.

Col. John A. Woodward, Howard, Centre County, Chairman.

1. Should the blackboard or chart be more generally used in our Institutes? Opened by Prof. S. B. Heiges.

2. What time, if any, should be given to verbal questions and answers? Opened by Gabriel Hiester.

3. What are the most important topics to discuss at Institutes the coming season? Opened by J. S. Burns.

4. How can farm life be made more attractive? Opened by Thos. J. Philips.

5. What course should Local Managers pursue in order to insure successful Institutes? Opened by R. J. Weld.

6. What topics should be discussed at the Ladies' Session, and should the men engage in the discussion? Opened by Alva Agee.

7. Best method of providing music; what should be its character? Opened by A. Judson Smith.

8. Is the Question Box a benefit to the Institute? What time should be given to it? Opened by H. G. McGowan.

9. Should the exhibition of farm products be encouraged at our Institutes? Opened by Jason Sexton.

10. What line of instruction is most needed by the farmer? Opened by Dr. M. E. Conard.

11. Should a lecturer discuss a topic in the same locality more than once? Opened by W. H. Stout.

12. In what way can the Local Manager best advertise an Institute? Opened by M. N. Clark.

13. What means should be used to procure a general co-operation of county agricultural societies? Opened by M. W. Oliver.

14. Experience of past season's Institute work.

COMMONWEALTH OF PENNSYLVANIA.

STATE LIVE STOCK SANITARY BOARD.

1901.

PRESIDENT.

Hon. William A. Stone, Governor.

VICE PRESIDENT.

Hon. Jesse K. Cope, Dairy and Food Commissioner.

TREASURER.

Prof. John Hamilton, Secretary of Agriculture.

SECRETARY.

Dr. Leonard Pearson, State Veterinarian.

AN ACT ESTABLISHING THE STATE LIVE STOCK SANITARY BOARD.

AN ACT

To establish the State Live Stock Sanitary Board of Pennsylvania, and to provide for the control and suppression of dangerous, contagious or infectious diseases of domestic animals.

Section 1. Be it enacted, etc., That a Board is hereby established to be known as "The State Live Stock Sanitary Board." This Board shall consist of the Governor of the Commonwealth, the Secretary of Agriculture, the State Dairy and Food Commissioner and the State Veterinarian, who shall be a competent and qualified person as provided in the act, entitled "An act to create a Department of Agriculture and define its duties."

Section 2. That it shall be the duty of the State Live Stock Sanitary Board to protect the health of the domestic animals of the State,

to determine and employ the most efficient and practical means for the prevention, suppression, control or eradication of dangerous, contagious or infectious diseases among the domestic animals, and for these purposes it is hereby authorized and empowered to establish, maintain, enforce and regulate such quarantine and other measures relating to the movements and care of animals and their products, the disinfection of suspected localities and articles and the destruction of animals, as it may deem necessary, and to adopt from time to time all such regulations as may be necessary and proper for carrying out the purposes of this act: Provided, however, In the case of any slowly contagious diseases only suspected or diseased animals shall be quarantined.

Section 3. That when it shall be deemed necessary to condemn and kill any animal or animals to prevent the further spread of disease, and an agreement cannot be made with the owners for the value thereof, three appraisers shall be appointed, one by the owner, one by the commission or its authorized agent, and the third by the two so appointed, who shall, under oath or affirmation, appraise the animal or animals, taking into consideration their actual value and condition at the time of appraisement, and such appraised price shall be paid in the same manner as other expenses under this act are provided for: Provided, That under such appraisement not more than twenty-five dollars shall be paid for any infected animal of grade or common stock, and not more than fifty dollars for any infected animal of registered stock, nor more than forty dollars for any horse or mule of common or grade stock and not to exceed fifty per cent. of the appraised value of any standard bred, registered or imported horses.

Section 4. That the Board or any member thereof, or any of their duly authorized agents, shall at all times have the right to enter any premises, farms, fields, pens, abattoirs, slaughter houses, buildings, cars or vessels, where any domestic animal is at the time quartered, or wherever the carcass of one may be, for the purpose of examining it in any way that may be deemed necessary to determine whether they are or were the subjects of any contagious or infectious diseases.

Section 5. That any person or persons wilfully violating any of the provisions of this act or any regulation of the State Live Stock Sanitary Board, or wilfully interfering with officers appointed under this act, shall be deemed guilty of misdemeanor and shall, upon conviction, be punished by a fine not exceeding one hundred dollars or by imprisonment not exceeding one month, or both, at the discretion of the court.

Section 6. That the State Live Stock Sanitary Board is hereby empowered to appoint and employ such assistants and agents and to

purchase such supplies and materials as may be necessary in carrying out the provisions of this act, and the Board and the members thereof are hereby empowered to administer oaths or affirmations to the appraisers appointed under this act, that they may order and conduct such examinations into the condition of the live stock of the State in relation to contagious diseases, including the milk supplies of cities, towns, boroughs and villages, as may seem necessary, and to take proper measures to protect such milk supplies from contamination.

Section 7. That all necessary expenses under the provisions of this act shall, after approval in writing by the Governor and the Secretary of Agriculture, be paid by the State Treasurer upon the warrant of the Auditor General in the manner now provided by law.

Section 8. That this act shall take effect June first, one thousand eight hundred and ninety-five, and all acts or parts of acts inconsistent herewith are hereby repealed.

Approved—May 21st, 1895.

AN ACT TO PROTECT THE HEALTH OF DOMESTIC ANIMALS.

AN ACT

To protect the health of the domestic animals of the Commonwealth of Pennsylvania.

Section 1. Be it enacted, &c., That the importation of dairy cows and neat cattle for breeding purposes into the Commonwealth of Pennsylvania is hereby prohibited, excepting when such cows and neat cattle are accompanied by a certificate from an inspector, whose competency and reliability are certified to by the authorities charged with the control of the diseases of domestic animals in the State from whence the cattle came, certifying that they have been examined and subjected to the tuberculin test and are free from disease.

Section 2. That in lieu of an inspection certificate as above required, the cattle may be detained at suitable stock-yards nearest to the State line on the railroad over which they are shipped, and there examined at the expense of the owner, or cattle as above specified from points outside of the State may, under such restrictions as may be provided by the State Live Stock Sanitary Board, be shipped in quarantine to their destination in Pennsylvania, there to remain in quarantine until properly examined at the expense of the owner, and released by the State Live Stock Sanitary Board.

Section 3. The State Live Stock Sanitary Board is hereby authorized and empowered to prohibit the importation of domestic animals into the Commonwealth of Pennsylvania, whenever in their judgment such measures may be necessary for the proper protection of the health of the domestic animals of the Commonwealth, and to make and enforce rules and regulations governing such traffic as may from time to time be required.

Section 4. That any person, firm, or corporate body violating the provisions of this act, shall be deemed guilty of a misdemeanor, and upon conviction shall, in the proper court of the county in which such cattle are sold, offered for sale, delivered to a purchaser, or in which such cattle may be detained in transit, for each offense, forfeit and pay a fine of not less than fifty dollars or more than one hundred dollars, or be punished by imprisonment for not less than ten days, and not exceeding thirty days, either or both, at the discretion of court. Such person, firm or corporate body shall be liable for the full amount of the damages that may result from the violation of this act.

Section 5. The State Live Stock Sanitary Board is hereby charged with the enforcement of this act, and is authorized to see that its provisions are obeyed, and to make, from time to time, such rules and regulations as may be necessary and proper for its enforcement.

Section 6. That this act shall go into effect January first, one thousand eight hundred and ninety-eight.

Approved—May 26, 1897.

RULES FOR THE ENFORCEMENT OF THE ACT OF MAY 26, 1897.

Dairy cows and neat cattle for breeding purposes may be brought into Pennsylvania from other States only in accordance with one of the three following provisions:

1. The cattle may be examined and tested with tuberculin in the State from whence they come by an inspector whose competency and reliability are certified to by the authorities charged with the control of the diseases of animals in that State. Special blanks for reporting upon such examinations will be furnished by the State Live Stock Sanitary Board upon application. Cattle thus examined, found to be free from disease and brought into Pennsylvania, shall remain in the possession of the person or persons who own them when

brought into Pennsylvania until the inspection reports have been approved by a member of the State Live Stock Sanitary Board or by an agent authorized to approve such reports. After such approval the cattle can be disposed of without restriction.

2. Dairy cows and neat cattle for breeding purposes may, if shippers so elect, be examined and tested with tuberculin at suitable stock-yards nearest to the State line on the railroad over which they are shipped. Such examinations are to be made by inspectors approved by this Board and at the expense of the owner of the cattle.

Cattle so inspected shall be marked with a suitable metal tag or shall be accurately described so that they can be reliably identified, and a report on the examination and test, with directions for identification, shall be submitted without delay to this Board.

3. Dairy cows and neat cattle for breeding purposes may be brought into Pennsylvania without previous examination only under the following conditions:

A. Notification to the State Live Stock Sanitary Board that it is proposed to bring certain dairy cows or neat cattle for breeding purposes into this State. Such notice must be accompanied by the number and a full and accurate description of the cattle, the names and addresses of the owner and consignee, the date upon which they are to be brought into the State, the route over which they are to be driven or shipped, and the destination.

A blank form to use in rendering this report will be sent upon application to the State Live Stock Sanitary Board.

B. Such cattle shall remain in strict quarantine during transit and after they have arrived at their destination until they have been examined and tested with tuberculin by an inspector approved by this Board. Under this quarantine it is required that the cattle shall be kept apart from other cattle, that they shall remain in the possession of the person or persons who bring them into this State and that their milk shall not be sold or used without previous sterilization by boiling.

Dairy cows or neat cattle for breeding purposes brought into Pennsylvania under this provision that are found upon examination or test to be tuberculous, shall be strictly isolated and quarantined, their milk cannot be used for any purpose whatever without previous sterilization by boiling, and they shall not be moved to other premises excepting for slaughter. No compensation shall be allowed for such cattle.

Approved by the State Live Stock Sanitary Board at Harrisburg, Pa., November 5, 1897.

LEONARD PEARSON,
Secretary.

A SUPPLEMENT TO AN ACT FOR THE TAXATION OF DOGS AND THE PROTECTION OF SHEEP.

A SUPPLEMENT

To an act, entitled "An act for the taxation of dogs and the protection of sheep," approved the twenty-fifth day of May, Anno Domini one thousand eight hundred and ninety-three, providing that the fund raised by the taxation of dogs be applied, in addition to the loss of sheep, for the loss of other domestic animals bitten by mad dogs.

Section 1. Be it enacted, &c., That the fund raised by the taxation of dogs, as provided by the act of the General Assembly, entitled "An act for the taxation of dogs and the protection of sheep," approved the twenty-fifth day of May, Anno Domini one thousand eight hundred and ninety-three, in addition to the application thereof for the payment of losses sustained by the destruction and damage to sheep, be applied for the payment of horses, mules, cattle and swine bitten by mad dog or mad dogs, and destroyed or necessary to be destroyed by reason thereof. Said damages shall be ascertained and recovered in the same manner as provided by sections three, four and five of the said act: Provided, That in no case shall the value of each horse or mule exceed one hundred dollars, the value of each head of cattle forty dollars, and each head of swine six dollars.

Section 2. All acts or supplements of acts inconsistent with the provisions of this supplement are hereby repealed: Provided, That this supplement shall not repeal or affect the provision of any special law relating to the same subject in any county, township, borough or city in this Commonwealth.

Approved—The 11th day of April, A. D. 1901.

AN ACT FOR THE PREVENTION OF THE SPREAD OF DISEASE FROM THE CARCASSES OF ANIMALS.

AN ACT

To provide for the prevention of the spread of disease from the carcasses of animals that die of dangerous or virulent disease, or are killed while afflicted with such disease; to provide for the safe disposal or destruction of such carcasses; to authorize the State Live Stock Sanitary Board to make regulations for the enforcement of this act; and to provide penalties for the violations of this act and of the regulations that may be made under it by the State Live Stock Sanitary Board.

Section 1. Be it enacted, &c., That when any domestic animal may die of, or be killed while afflicted with, an infectious, contagious, germ or parasitic disease, adjudged by the State Live Stock Sanitary Board to be of a dangerous or virulent character, and in particular when any domestic animal may die or be killed while it is afflicted with any one of the diseases known as anthrax, black quarter, hog cholera, swine plague, rabies or glanders, the owner or owners of such animal shall at once destroy or dispose of the carcass of such animal by one of the methods herein provided.

Section 2. The methods of destruction or disposal shall be of a kind that will completely destroy or securely sequester the poison, germ, parasite or infective agent of the disease with which the animal was afflicted at the time of death. The following methods of destruction or disposal shall be allowed: One. Complete burning or cremation of the carcass, and of all of its parts and products. Two. Boiling the carcass and all of its parts and products in water, or heating the same with steam, at the temperature of boiling water, for at least two hours. Three. Burying the carcass and all of its parts and products in a place that is not subject to overflow from ponds or streams, that is distant not less than one hundred feet from any water-course, well, spring, public highway or building used as a house or stable, and in the following manner to wit: The grave shall be of such a depth that when the carcass and the parts and products thereof are placed in it, and the grave is filled with earth and the top is smoothed to the level of the surrounding surface, the uppermost part of the carcass and of its parts and products shall be completely covered; and, further, the grave shall be so protected that the carcass cannot be dug out or exposed by dogs or other ani-

mals. Before the carcass and its parts and products are covered with earth they shall be covered with lime, to a depth of not less than three inches. Any other method of destroying or disposing of carcasses, and of the parts and products of carcass, may be practiced that is specifically approved by the State Live Stock Sanitary Board.

Section 3. If any person owning an animal that dies while it is afflicted with anthrax, black quarter, hog cholera, swine plague, rabies or glanders, or any other infectious, contagious, germ or parasitic disease, that is adjudged by the State Live Stock Sanitary Board to be of a dangerous or virulent character, shall, after notification by anyone, neglect within twenty-four hours to destroy or dispose of the carcass and its parts and products in accordance with the provisions of section two of this act, the said person shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not less than ten dollars nor more than one hundred dollars, at the discretion of the court.

Section 4. When the carcass and products of any animal that died while afflicted with any of the diseases specified in section one of this act, or of any infectious, contagious, germ or parasitic disease, adjudged by the State Live Stock Sanitary Board to be of a dangerous or virulent character, is not disposed of or destroyed in one of the ways set forth in section two of this act, and this fact shall be brought to the attention of an agent of the State Live Stock Sanitary Board, the board of health of the township, borough or city in which the death occurs or in which the carcass of the animal may be; or when this fact shall be brought to the attention of any member of such board of health; or in the event that there is no board of health having jurisdiction, when any township auditor, of a township in which such a carcass may be, is notified of the fact; it shall be the duty of the said agent of the State Live Stock Sanitary Board, or member of a board of health, or said health board, or said township auditor, to at once cause the carcass and its parts and products to be disposed of or destroyed in accordance with the methods prescribed in section two of this act.

The disposal or destruction of the carcass shall be carried out in a way that is as economical as is compatible with efficiency and safety, and a fully itemized bill of the expense incurred shall be drawn up by the agent of the State Live Stock Sanitary Board, the board of health, or the board of township auditors, and forwarded as a voucher to the State Live Stock Sanitary Board. If the voucher is approved by said board, it shall be paid in the same manner as other expenses of said board are paid: Provided, however, That no charge shall be paid of more than ten dollars for the destruction of a single carcass of a horse, mule, cow, bull, or ox; nor more than

three dollars for the destruction of a single carcass of a colt, calf, sheep, hog, or dog.

Section 5. The cost of the destruction of the carcass or carcasses, as hereinbefore provided, shall constitute a lien on the property of the owner or owners of the animals at the time of their death; and it shall be the duty of the State Live Stock Sanitary Board to attempt to recover, and if possible to recover, by due process of law, from said owner or owners the amounts expended by it for disposing of or destroying the carcass of their animals, in the enforcement of this act.

Approved—The 2d day of May, A. D. 1901.

EXTRACTS FROM THE RULES AND REGULATIONS OF THE STATE LIVE STOCK SANITARY BOARD OF PENNSYLVANIA.

Upon application from owners of tuberculous cattle, the State Live Stock Sanitary Board will furnish tuberculin and inspections free, on condition that the cattle owner will agree to:

1. Assist in the examination.
 2. Separate the cattle found to be tuberculous from those that are healthy, and have them cared for separately until disposed of, as directed by the State Live Stock Sanitary Board.
 3. Disinfect the stables and correct faulty sanitary conditions, as directed by the State Live Stock Sanitary Board.
 4. Discontinue the use of milk and cream from infected cows, except when boiled or heated to 185 degrees F. and kept at this temperature for five minutes.
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Upon application from owners of dairy herds, the State Live Stock Sanitary Board will conduct or direct inspections of cattle and cattle stables and yards, and will furnish certificates showing the health of the animals and the sanitary condition of their surroundings: Provided, That the applicant will agree to bear the necessary expense of such inspections.

Since it is manifestly impossible for the State Live Stock Sanitary Board to investigate all rumors or unsubstantiated reports of contagious disease among domestic animals, the State Veterinarian may,

if in his opinion there exists a reasonable doubt as to the dangerous, contagious or infectious character of a reported disease, request the owner or person in charge of the stock, at his own expense, to have an examination made by a competent veterinarian, and furnish a report from such veterinarian to the Secretary of the Board. In case this request is not complied with, the Board may decline to consider the case.

The following blank is furnished by the Board:

"To the State Live Stock Sanitary Board, Harrisburg, Pennsylvania:

"Gentlemen: I have had my entire herd inspected and tested with tuberculin and have reason to believe that some of my cattle are affected with tuberculosis.

"I have had this inspection and test made at my own expense and now wish to dispose of the diseased animals in accordance with the rules and regulations of the State Live Stock Sanitary Board and to avail myself of the assistance afforded by the Commonwealth in such cases. If such assistance is furnished, I agree to thereafter observe the precautions and measures and to employ the means recommended by your Board to prevent the reintroduction and redevelopment of tuberculosis in my herd.

"My herd includes the following animals: Cows, heifers over one year old,, bulls over one year old,, steers,, calves under one year old,; total, The milk from this herd is used by for

The cattle are,

The inspection and test were made by of on 190 ..

"I certify that, to the best of my knowledge and belief, none of the dairy cows or cattle for breeding purposes in my herd have been brought from another State into Pennsylvania since January 1, 1898, without having been subjected to inspection and tuberculin test, as required by law.

Yours respectfully,

.....
(Address)
..... County, Pa."

The usual application form is the following:

"To the State Live Stock Sanitary Board, Harrisburg, Pennsylvania:

"Gentlemen: I have reason to believe that some of my cattle are afflicted with tuberculosis, and I wish to have my entire herd in-

spected, and tested with tuberculin, if such test is deemed necessary by your representative, and the diseased animals disposed of according to the rules and regulations of the State Live Stock Sanitary Board.

"I understand that this inspection and test are to be made at the expense of the Commonwealth and, in consideration thereof, I agree to thereafter observe the precautions and measures and to employ the means recommended by your Board to prevent the reintroduction and redevelopment of tuberculosis in my herd.

"I certify that, to the best of my knowledge and belief, none of the dairy cows or cattle for breeding purposes in my herd have been brought from another State into Pennsylvania since January 1, 1898, without having been subjected to inspection and tuberculin test, as required by law

Yours respectfully,

(Address)

..... County, Pa.

"My herd includes the following animals: Cows, heifers
over one year old,, bulls over one year old,,
steers,, calves under one year old,; total,
The milk from this herd is used by for"

"The cattle are
(State breed and whether registered.)

"The following are my reasons for believing that some of my cattle are afflicted with tuberculosis:

PENNSYLVANIA LIVE STOCK BREEDERS' ASSOCIATION.

1901.

OFFICERS AND COMMITTEES.

PRESIDENT.

W. C. Norton,Aldenville.

FIRST VICE PRESIDENT.

Henry Palmer,Avondale.

SECOND VICE PRESIDENT.

M. P. Shoemaker,Greensburg.

SECRETARY.

E. S. Bayard,201 Shady Ave., E. E., Pitts-
burg.

TREASURER.

J. F. Lantz,Wyebrook.

EXECUTIVE COMMITTEE.

W. G. Powell, Shadeland,Representing horses.
H. W. Comfort, Fallsington,Representing cattle.
Wm. Berry, Clokey,Representing sheep.
Geo. W. Church, Waynesburg,Representing swine.
Geo. C. Watson, State College,Representing poultry.
H. A. Field, Wellsboro,Representing Angora goats.

LEGISLATIVE COMMITTEE.

W. H. H. Riddle, Chairman,Butler.
R. L. Munce,Canonsburg.
W. F. Gable,Altoona.
Dr. Thomas Turnbull,Allegheny.
Wm. R. Williams,Philadelphia.
E. S. Bayard,201 Shady Ave., E. E., Pitts-
burg.
W. C. Norton, ex-officio,Aldenville.

COMMITTEE ON FAIRS.

W. C. Black, Chairman,	Mercer.
James Blair,	Espyville Station.
W. H. Rink,	Jennerstown.
A. S. Worden,	Ulysses.
E. L. McSparran,	Goshen.
J. L. Henderson,	Washington.
W. F. Holtzer,	Greensburg.
Geo. H. Fowler,	Stoneboro.
W. A. McCoy,	Mercer.
J. W. Taylor,	Kennett Square.

COMMITTEE ON TRANSPORTATION.

Julius LeMoyne, Chairman,	Washington.
Dr. Leonard Pearson,	Philadelphia.
Prof. Harry Hayward,	State College.
T. E. Orr,	Pittsburg.
D. L. Stevens,	Elkdale.

CONSTITUTION OF THE PENNSYLVANIA LIVE STOCK BREEDERS' ASSOCIATION.

The object of this association is to encourage and advance the live stock interests of Pennsylvania.

Article I—Membership. Any reputable breeder of pure-bred live stock who is a resident of Pennsylvania may become a member of this association upon the payment of the annual dues.

Article II—Associate Membership. Any person interested in improved live stock, and in sympathy with the objects of this association, may become an associate member by the payment of the annual dues, but is not entitled to vote.

Article III—Dues. The annual dues shall be one dollar, payable (in advance) on or before the annual meeting.

THE PENNSYLVANIA HORTICULTURAL SOCIETY.

FOUNDED 1827.

OFFICERS AND COMMITTEES FOR THE YEAR 1901.

PRESIDENT.

James M. Rhodes.

VICE PRESIDENTS.

Dr. Geo. Goebel,
Edward L. Boutillier,

Henry F. Michell,
John McCleary.

TREASURER.

S. W. Keith.

SECRETARY.

David Rust.

PROFESSOR OF BOTANY.

Thomas Meehan.

PROFESSOR OF HORTICULTURAL CHEMISTRY.

Dr. Persifor Frazer.

PROFESSOR OF ENTOMOLOGY.

Rev. H. C. McCook, D. D.

EXECUTIVE COUNCIL.

Chester Davis, Chairman:

J. Cheston Morris, M. D.,
Wm. K. Harris,
John Thatcher,

Thomas Long,
Wm. Fowler,
Francis Canning.

MEMBER OF THE STATE BOARD OF AGRICULTURE.

Edwin Lonsdale.

SECTIONS COMMITTEE.

J. Cheston Morris, M. D., Chairman:

Burnet Landreth,
Mrs. E. S. Starr,
Edwin Lonsdale.

Wm. F. Dreer,
Robert Craig,

FINANCE COMMITTEE.

Robert Craig, Chairman:

Henry F. Mitchell,

C. Hartman Kuhn.

LIBRARY COMMITTEE.

Burnet Landreth, Chairman:

C. Hartman Kuhn,

George C. Watson,

J. D. Rand,

S. W. Keith.

COMMITTEE FOR ESTABLISHING PREMIUMS.

Edwin Lonsdale, Chairman:

W. Atlee Burpee,

John G. Gardner,

Wm. K. Harris,

John Wescott.

John McCleary,

PLANTS.

J. W. Colflesh, Chairman:

W. A. Manda,

Jos. Hurley,

Chester Davis,

James Verner.

FLOWERS.

A. B. Cartledge, Chairman:

A. B. Scott,

S. S. Pennock,

C. Eisele,

H. B. Surman.

FRUITS.

John G. Gardner, Chairman:

John C. Lewis,

Wm. Warner Harper.

VEGETABLES.

W. Atlee Burpee, Chairman:

Wm. F. Dreer,

S. P. Landreth,

Wm. Fowler,

J. Cheston Morris, M. D.

COMMITTEE TO ARRANGE FOR AND SUPERINTEND EXHIBITIONS.

Geo. E. Campbell, Chairman:

D. T. Connor,

Sidney W. Keith,

David Bearn,

Jos. Heacock,

W. K. Harris,

C. Hartman Kuhn,

John Wescott,

Robert Craig,

John Gaynor,

Jos. McGregor.

COMMITTEE OF MUSIC AND PRINTING.

Burnet Landreth, Chairman:

David Rust,

S. W. Keith,

W. H. Ackley.

HOUSE COMMITTEE.

C. Hartman Kuhn, Chairman:

Wm. F. Dreer,

James M. Rhodes.

LIBRARIAN.

David Rust.

COMMITTEE TO EXAMINE AND MAKE AWARDS ON NEW OR CHOICE
PLANTS, FLOWERS, FRUITS AND VEGETABLES.

PLANTS.

Edwin Lonsdale, Chairman:

Robert Craig,

John Westcott.

J. D. Eisele,

Alphonse Pericat.

Wm. K. Harris,

FLOWERS.

Alex. B. Scott,

Henry B. Surman,

A. B. Cartledge,

A. M. Herr.

Samuel S. Pennock,

FRUITS AND VEGETABLES.

W. Atlee Burpee,

J. Otto Thilow,

John G. Gardner,

Jos. McGregor.

P. Pedersen,

Exhibits must be ready for examination by this Committee at 3 P. M. on the dates of the regular monthly stated meetings of the Society (the third Tuesday of each month) and remain on exhibition until the close of the regular meeting in the evening.

Exhibitors of new or choice plants, flowers, fruits and vegetables are required to furnish, in writing, to the Committee, whenever possible, full particulars about their exhibit, as to its origin: if a seedling, its parentage; if a foundling, under what conditions it was found; if a sprout, what it sprouted from; also its principal characteristics, and to inform the Secretary of the Society, one week previous, of their intention to exhibit.

RULES GOVERNING EXHIBITIONS.

1. Entries should be made with the Secretary at least one week before the opening, with full list of articles and statement of classes in which they are entered.

2. No exhibit can be staged until the exhibitor has furnished the Secretary with a full list of all the articles offered. This rule applies to articles "for exhibition only" as well as to exhibits entered for competition.

3. All exhibits must be correctly labeled on stiff cards of a uniform size. These cards will be furnished free by the Society on application to the Secretary.

4. All entries not made according to schedule will be disqualified.

5. When possible, exhibits should be delivered at the Exhibition Hall by 6 P. M. of the evening preceding the exhibition, and all exhibits must be in position by 12 noon on the day specified.

6. All plants shown in competition (except imported plants shown for the first time in the country and novelties) must have been in the possession of the exhibitor at least four months preceding the exhibition.

7. All entries must be staged by numbers only, the names of exhibitors to be attached after awards are made.

8. No competitor shall receive more than one premium in each class for which he competes.

9. The Committee awarding premiums may award a certificate of merit or medal for meritorious exhibits in addition to the regular premiums of the Society.

10. No person shall be allowed to remain in the hall during the time the judges and their assistants are at work.

11. The amount of \$3.00 shall be deducted from all premiums awarded to persons not members of the Society.

12. No awards will be made to unworthy objects, even though they may be the only ones of their kind on exhibition.

13. Exhibits sent from a distance should be addressed to the Secretary, and express charges invariably prepaid.

14. No exhibit shall be removed until the close of the exhibition, except with the consent of the officers in charge.

15. No card larger than 11 x 14 inches shall be allowed on any exhibits, and all cards must be confined to the exhibitor's own exhibit.

16. Each person who becomes an exhibitor thereby agrees to conform strictly to the rules and regulations.

PATRONS OF HUSBANDRY.

OFFICERS OF PENNSYLVANIA STATE GRANGE FOR THE YEAR 1901.

MASTER.

W. F. Hill, Westford, Crawford county.

OVERSEER.

A. C. Barrett, New Milford, Susquehanna county.

LECTURER.

Albert M. Cornell, Altus, Bradford county.

STEWARD.

H. M. Gooderham, Patton, Cambria county.

ASSISTANT STEWARD.

Henry H. Pratt, Goshenville, Chester county.

CHAPLAIN.

Rev. W. H. Clipman, Finleyville, Washington county.

TREASURER.

S. E. Nivin, Landenburg, Chester county.

SECRETARY.

J. T. Ailman, Thompsontown, Juniata county.

GATEKEEPER.

W. Chase, Fall Brook, Tioga county.

CERES.

Mrs. V. B. Holiday, Crooked Creek, Tioga county.

LADY STEWARD.

Mrs. Mary Bloom, Lock Haven, Clinton county.

FLORA.

Miss Florence Rhone, Centre Hall, Centre county.

POMONA.

Mrs. L. A. Thayer, Atlantic, Crawford county.

FINANCE COMMITTEE.

D. B. McWilliams, Port Royal, Juniata county.

S. S. Blyholder, Leechburg, Armstrong county.

John T. Patton, Warriors' Mark, Huntingdon county.

EXECUTIVE COMMITTEE.

Hon. Louis Piolet, Wysox, Bradford county.

G. W. Oster, Osterburg, Bedford county.

I. Frank Chandler, Toughkenamon, Chester county.

LEGISLATIVE COMMITTEE.

Hon. W. T. Creasy, Catawissa, Columbia county.

Hon. Hampton Rice, Lumberville, Bucks county.

Hon. Leonard Rhone, Centre Hall, Centre county.

CENTRE OF COMMUNICATION.

S. B. Day, Washington R. Division No. 7, Washington county.

THE GRANGE.

ORDER OF PATRONS OF HUSBANDRY.

ITS ORIGIN.

The Order of the Patrons of Husbandry originated in the mind of O. H. Kelley, a man of New England birth, who went to Minnesota in his early manhood, and became a farmer in that section of the country.

In 1864 he was appointed a clerk in the Department of Agriculture at Washington. Two years later, in January, 1866, Mr. Kelley was commissioned by Hon. Isaac Newton, Commissioner of Agriculture, to visit the Southern States, lately in hostility to the government, for the purpose of obtaining statistical and other information in regard to the condition of the South, and report the same to the Department at Washington.

It was while traveling in the South in obedience to these instructions, that the thought of a secret society of agriculturists, for the protection and advancement of their interests, and as an element to restore kindly feelings among the people, first occurred to Mr. Kelley.

The idea of giving women full membership in the proposed Order originated with Miss Carrie A. Hall, of Boston, Mass., a niece of Mr. Kelley, to whom he had imparted his views of the new association after his return from the South. In the full formation of the Order, six other men were directly associated with Mr. Kelley, namely, William Saunders, of the Department of Agriculture, who next to Mr. Kelley, did most in originating the order, Rev. A. B. Grosh, of the same Department, William M. Ireland, of the Postoffice Department, Rev. John Trimble and J. R. Thompson, of the Treasury Department, and F. M. McDowell, a pomologist, of Wayne, N. Y., all of whom, with one exception, were born upon a farm.

These seven men were the founders of the Order, and for nearly two years they labored with great energy, and with a faith and zeal amounting almost to inspiration, until, with the assistance of friends who became interested in the plan, they completed a well-devised scheme of organization, based upon a ritual of four degrees for men and four for women, which is unsurpassed in the English language for originality of thought, purity of sentiment, and beauty of diction.

Having formed a constitution to govern the Order to which this ritual was adopted, these men met on the fourth day of December,

1867, and constituted themselves the National Grange of the Patrons of Husbandry, with William Saunders as master, J. R. Thompson, lecturer, William M. Ireland, treasurer, and O. H. Kelley, secretary. The remaining offices, for obvious reasons, were left vacant.

The little brown building in which the organization was effected was at that time the office of Mr. Saunders, and stood embowered with the trees in the gardens of the Agricultural Department on the corner of Four-and-half street and Missouri avenue. Later, the late Colonel Aiken of South Carolina, and other interested members of the Order made vigorous efforts to have the government preserve this historic building, but they were unsuccessful in their efforts.

The first Subordinate Grange was organized in Washington, D. C., the 8th day of January, 1868, as a school of instruction, with William M. Ireland as master.

The first dispensation for a Grange was granted at Harrisburg, Pa., the 4th day of April, 1868, but the first regular Subordinate Grange to which a charter was issued was organized at Fredonia, N. Y., the 16th day of April, 1868.

The first State Grange, that of Minnesota, was organized the 22d day of February, 1869. The new Order made slow progress up to 1872, only 257 Granges having been organized in the entire country. During the year 1872, 1,105 were organized and the Order had an existence in twenty-two States.

The first meeting of the National Grange, as a delegate body, was held at Georgetown, D. C., the 8th day of January, 1873, with six of the founders of the Order and seventeen delegates present, representing eleven States; six of the delegates were masters of State Granges, and the remainder were deputies in the Order. In addition to these, four women were present, viz: Miss Carrie A. Hall, Mrs. O. H. Kelley, Mrs. D. W. Adams and Mrs. J. C. Abbott. The total number of Granges organized previous to this meeting was 1,362. Nearly 30,000 charters have been issued to January 1, 1900.

DECLARATION OF PURPOSES OF THE PATRONS OF HUSBANDRY.

PREAMBLE.

Profoundly impressed with the truth that the National Grange of the United States should definitely proclaim to the world its general objects, we hereby unanimously make this Declaration of Purposes of the Patrons of Husbandry:

GENERAL OBJECTS.

1. United by the strong and faithful tie of Agriculture, we mutually resolve to labor for the good of our Order, our country, and mankind.

2. We heartily endorse the motto: "In essentials, unity; in non-essentials, liberty; in all things, charity."

3. We shall endeavor to advance our cause by laboring to accomplish the following objects:

To develop a better and higher manhood and womanhood among ourselves. To enhance the comforts and attractions of our homes, and strengthen our attachments to our pursuits. To foster mutual understanding and co-operation. To maintain inviolate our laws, and to emulate each other in labor, to hasten the good time coming. To reduce our expenses, both individual and corporate. To buy less and produce more, in order to make our farms self-sustaining. To diversify our crops, and crop no more than we can cultivate. To condense the weight of our exports, selling less in the bushel and more on the hoof and in fleece; less in lint, and more in warp and woof. To systematize our work, and calculate intelligently on probabilities. To discountenance the credit system, the mortgage system, the fashion system, and every other system tending to prodigality and bankruptcy.

We propose meeting together, talking together, working together, buying together, selling together, and, in general, acting together for our mutual protection and advancement, as occasion may require. We shall avoid litigation as much as possible by arbitration in the Grange. We shall constantly strive to secure entire harmony, good will, vital Brotherhood among ourselves, and to make our Order perpetual. We shall earnestly endeavor to suppress personal, local, sectional, and national prejudices, all unhealthy rivalry, all selfish ambition. Faithful adherence to these principles will insure our mental, moral, social, and material advancement.

BUSINESS RELATIONS.

4. For our business interests, we desire to bring producers and consumers, farmers and manufacturers, into the most direct and friendly relations possible. Hence we must dispense with a surplus of middle men, not that we are unfriendly to them, but we do not need them. Their surplus and their exactions diminish our profits.

We wage no aggressive warfare against any other interests whatever. On the contrary, all our acts and all our efforts, so far as business is concerned, are not only for the benefit of the producer and consumer, but also for all other interests that tend to bring these two parties into speedy and economical contact. Hence we hold that

transportation companies of every kind are necessary to our success, that their interests are intimately connected with our interests, and harmonious action is mutually advantageous, keeping in view the first sentence of our Declaration of Principles of action, that "Individual happiness depends upon general prosperity."

We shall, therefore, advocate for every State the increase in every practical way, of all facilities for transporting cheaply to the seaboard, or between home producers and consumers, all the productions of our country. We adopt it as our fixed purpose to "open out the channels in nature's great arteries, that the life blood of commerce may flow freely."

We are not enemies of railroads, navigable and irrigating canals, nor any corporation that will advance our industrial interests, nor of any laboring classes.

In our noble Order there is no communism, no agrarianism.

We are opposed to such spirit and management of any corporation or enterprise as tends to oppress the people and rob them of their just profits. We are not the enemies to capital, but we oppose tyranny of monopolies. We long to see the antagonism between capital and labor removed by common consent, and by an enlightened statesmanship worthy of the nineteenth century. We are opposed to excessive salaries, high rates of interest and exorbitant per cent. profits in trade. They greatly increase our burdens, and do not bear a proper proportion to the profits of producers. We desire only self-protection, and the protection of every true interest of our land, by legitimate transactions, legitimate trade, legitimate profits.

EDUCATION.

We shall advance the cause of education among ourselves, and for our children, by all just means within our power. We especially advocate for our agricultural and industrial colleges, that practical agriculture, domestic science, and all the arts which adorn the home, be taught in their courses of study.

THE GRANGE NOT PARTISAN.

5. We emphatically and sincerely assert the oft repeated truth taught in our organic law, that the Grange—National, State, or Subordinate—is not a political or party organization. No grange, if true to its obligations, can discuss partisan or sectarian questions, nor call political conventions, nor nominate candidates, nor even discuss their merits in its meetings.

Yet the principles we teach underlie all true politics, all true statesmanship, and if properly carried out will tend to purify the whole political atmosphere of our country. For we seek the greatest good to the greatest number.

We must always bear in mind that no one, by becoming a Patron of Husbandry, gives up that inalienable right and duty which belongs to every American citizen, to take a proper interest in the politics of his country.

On the contrary, it is right for every member to do all in his power legitimately to influence for good the action of any political party to which he belongs. It is his duty to do all he can in his own party to put down bribery, corruption, and trickery; to see that none but competent, faithful and honest men, who will unflinchingly stand by our interests, are nominated for all positions of trust; and to have carried out the principle which should always characterize every Patron, that the office should seek the man, and not the man the office.

We acknowledge the broad principle that difference of opinion is no crime, and hold that "progress toward truth is made by difference of opinion," while "the fault lies in bitterness of controversy."

We desire proper equality, equity and fairness; protection for the weak, restraint upon the strong, and in short, justly distributed burdens and justly distributed power. These are American ideas, the very essence of American independence, and to advocate to the contrary is unworthy of the sons and daughters of the American Republic.

We cherish the belief that sectionalism is, and of right should be, dead and buried with the past. Our work is for the present and future. In our agricultural brotherhood and its purposes, we shall recognize no North, no South, no East, no West.

It is reserved by every Patron, as the right of a freeman, to affiliate with any party that will best carry out his principles.

OUTSIDE CO-OPERATION.

6. Our being peculiarly a farmers' institution, we cannot admit all to our ranks.

Many are excluded by the nature of our organization, not because they are professional men, or artisans, or laborers, but because they have not a sufficient direct interest in tilling the soil, or may have some interest in conflict with our purposes. But we appeal to all good citizens for their cordial co-operation to assist in our efforts towards reform, that we may eventually remove from our midst the last vestige of tyranny and corruption.

We hail the general desire for fraternal harmony, equitable compromise, and earnest co-operation, as an omen of our future success.

CONCLUSION.

7. It shall be an abiding principle with us to relieve any of our oppressed and suffering brotherhood by any means at our command.

Last, but not least, we proclaim it among our purposes to inculcate a proper appreciation of the abilities and sphere of women, as is indicated by admitting her to membership and position in our Order.

Imploring the continued assistance of our Divine Master to guide us in our work, we here pledge ourselves to faithful and harmonious labor for all future time, to return by our united efforts to the wisdom, justice, fraternity, and political purity of our forefathers.

PENNSYLVANIA FARMER'S ALLIANCE AND INDUSTRIAL UNION.

OFFICERS FOR 1901.

PRESIDENT.

W. A. Gardner, Andrews' Settlement.

VICE PRESIDENT.

G. W. Branthaver, New Franklin.

SECRETARY AND BUSINESS AGENT.

D. M. Omwake, Greencastle.

TREASURER.

Andrew Storry, Pettis.

LECTURERS.

District No. 1, Northeast.

W. F. Kilmer, Waymart.

District No. 2, Northwest.

A. K. Earle, Inez.

District No. 3, Southwest.

H. N. Price, St. Lawrence.

District No. 4, Southeast.

A. B. Lehman, Fayetteville.

EXECUTIVE BOARD.

W. A. Gardner, Chairman, Andrews' Settlement.

G. W. Kilmer, Secretary, Towanda.

A. J. Robinson, Greenville.

A. W. Kenyon, Clifford.

O. F. Berger, Shartlesville.

CONSTITUTION AND BY-LAWS OF THE PENNSYLVANIA STATE FARMERS' ALLIANCE AND INDUSTRIAL UNION.

DECLARATION OF PURPOSES.

Whereas, The general condition of our country imperatively demands unity of action on the part of the farming and laboring classes, reformation in economy, and the dissemination of principles best calculated to encourage and foster agricultural and mechanical pursuits, encouraging the toiling masses, leading them in the road to prosperity, and providing a just and fair remuneration for labor, a just exchange for our commodities, and the best means of securing to the laboring classes the greatest amount of good; we hold to the principle that all overpowering monopolies are dangerous to the best interests of our country, tending to enslave a free people, and subvert and finally overthrow the great principles purchased to the fathers of American liberty. We, therefore, adopt the following as our declaration of principles:

1. To labor for the education of the agricultural classes in the science of economical government, in a strict non-partisan spirit, and to bring about a more perfect union of said classes.

2. That we demand equal rights, and exact justice to all and special favors to none.

3. To endorse the motto, "In things essential, unity; and in all things, charity."

4. To develop a better state, mentally, morally, socially and financially.

5. To constantly strive to secure entire harmony and good will to all mankind, and brotherly love among ourselves.

6. To suppress personal, local, sectional and national prejudices; all unhealthy rivalry, and all selfish ambition.

7. The brightest jewels which it garners are the tears of widows and orphans, and its imperative commands are to visit the homes where lacerated hearts are bleeding; assuage the sufferings of a brother or sister; bury the dead, care for the widows, and educate the orphans; to exercise charity towards offenders; to construe words and deeds in their most favorable light, granting honesty of purpose and good intention to others; and to protect the principles of the Alliance unto death. Its laws are reason and equity; its cardinal doctrines inspire purity of thought and life; its intention is, "on earth peace and good will toward men."

8. We are, furthermore, more than ever profoundly impressed with the importance of unity of action in practice, as well as theory, in order that the true interests of the country, as well as the town and city, may be completely subversed.

PENNSYLVANIA STATE COLLEGE.

SCHOOL OF AGRICULTURE.

1901.

FACULTY.

GEORGE W. ATHERTON, LL. D., President.

HENRY PRENTISS ARMSBY, Ph. D., Dean,
Lecturer on Stock Feeding.

WILLIAM A. BUCKHOUT, M. S.,
Professor of Botany and Horticulture.

WILLIAM FREAR, Ph. D.,
Professor of Agricultural Chemistry.

GEORGE C. WATSON, B. Agr., M. S.
Professor of Agriculture and Superintendent of Correspondence Courses.

LEONARD PEARSON, B. S., V. M. D.,
Special Lecturer on Veterinary Science.

GEORGE C. BUTZ, M. S.,
Assistant Professor of Horticulture.

HARRY HAYWARD, B. S.,
Assistant Professor of Dairy Husbandry.

C. A. BROWNE, JR., A. M.,
Assistant in Agricultural Chemistry.

OTHER INSTRUCTORS.

I. THORNTON OSMOND, M. S., M. A.,
Professor of Physics.

LOUIS E. REBER, M. S.,
Professor of Mechanics and Mechanical Engineering.

GEORGE GILBERT POND, M. A., Ph. D.,
Professor of Chemistry and Director of the Chemical Laboratories.

.....
Professor of Mining Engineering and Geology.

FRED. E. FOSS, B. S., M. A.,
Professor of Civil Engineering.

JOSEPH M. WILLARD, B. A.,
Professor of Mathematics.

FRED. LEWIS PATTEE, M. A.,
Professor of English and Rhetoric.

HARVEY A. SURFACE, M. S.,
Professor of Zoology.

CARL D. FEHR, M. A.,
Assistant Professor of German.

ANNA E. REDIFER,
Assistant Professor of Industrial Art and Design.

IRVING L. FOSTER, M. A.,
Assistant Professor of Romance Languages.

THE PENNSYLVANIA STATE COLLEGE AGRICULTURAL EXPERIMENT STATION.

1901.

ADVISORY COMMITTEE OF BOARD OF TRUSTEES.

THE HON. JOHN A. WOODWARD, Chairman:Howard.
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 H. V. WHITE, Esq.,Bloomsburg.
 SAMUEL R. DOWNING, Esq.,Goshenville.
 GEO. W. ATHERTON, LL.D., President of the College,State College.
 HENRY PRENTISS ARMSBY, Ph.D., Secretary of the Committee.

OFFICERS AND ASSISTANTS.

THE PRESIDENT OF THE COLLEGE.

HENRY PRENTISS ARMSBY, Ph.D.,Director.
 WILLIAM FREAR, Ph.D.,Vice Director and Chemist.
 WILLIAM A. BUCKHOUT, M. S.,Botanist.
 GEORGE C. BUTZ, M. S.,Horticulturist.
 GEORGE C. WATSON, M. S.,Agriculturist.
 HARRY HAYWARD, B. S.,Dairy Husbandry.
 WILLIAM C. PATTERSON,Superintendent of Farm.
 MISS JULIA CATHARINE GRAY,Secretary.
 J. AUGUST FRIES, B. S.,Assistant Chemist.
 CHARLES ALBERT BROWNE, Jr., M. A.,
 CASSIUS W. NORRIS, } Assistant Chemists.
 JAMES P. PILLSBURY,Assistant in Horticulture.
 MILTON S. McDOWELL, M. S.,
 CHARLES P. BEISTLE, B. S., } Assistant Chemists.
 MELVIN H. PINGREE, B. S.,
 MISS MARY GARNER,Stenographer.
 WM. T. CARTER, B. S.,Fellow in Agricultural Chemistry.
Fellow in Dairy Husbandry.

Telegraph, Postoffice, Railroad and Express Station
 STATE COLLEGE, CENTRE COUNTY, Pa.
 Telephone Connection.

☞ The bulletins and reports of the Station will be mailed regularly, free of charge, to all residents of the State who request it, so far as the supply will permit. Address, Director of Experiment Station, State College, Centre County, Pa.

Visitors will be welcomed at all times and given every opportunity to inspect the Station and all its departments.

PENNSYLVANIA FORESTRY ASSOCIATION.

1901.

President, John Birkinbine.

Vice Presidents, Herbert Welsh.

Wm. S. Harvey,

Richard Wood,

James C. Haydon,

Howard M. Jenkins.

General Secretary, Dr. Joseph T. Rothrock.

Corresponding Secretary, Mrs. John P. Lundy.

Treasurer, Charles E. Pancoast.

COUNCIL.

At Large, Mrs. Brinton Coxe.

Dr. Alfred L. Elwyn.

Albert Lewis.

Allegheny county, Hon. Geo. W. Guthrie,

George M. Lehman,

Henry Phipps.

Berks county, Mrs. George Brooke,

J. H. Sternbergh.

Blair county, Harvey Linton.

Bradford county, C. S. Maurice.

Bucks county, Mrs. Geo. T. Heston,

Alfred Paschall.

Dr. Howard Pursell.

Cambria county, Hartley C. Wolle.

Carbon county, M. S. Kemmerer.

Centre county, Prof. Wm. A. Buckhout.

Chester county, Hugh DeHaven.

Wm. S. Kirk,

Samuel Marshall.

Clarion county, Jos. M. Fox.

Clearfield county, John E. DuBois.

Clinton county, A. F. Ryon.

Cumberland county, J. C. Fuller.

Dauphin county, E. C. Felton,

Miss Mira L. Dock.

Delaware county, Charles Potts.

Elk county, Hon. George R. Dixon.

Erie county, Ira J. Dunn, M. D.

Fayette county, Hon. Nathaniel Ewing.

Forest county, Samuel D. Irwin.

Franklin county, Col. T. B. Kennedy.
Huntingdon county, Mrs. William Dorris.
Jefferson county, J. C. Cochran, M. D.
Lackawanna county, G. Edgar Dean, M. D.,
 Hon. L. A. Watres.
Lancaster county, J. H. Baumgardner,
 Hon. C. C. Kauffman.
Lebanon county, Mrs. Bertham Dawson Coleman.
Lehigh county, Dr. William Herbst.
Luzerne county, Mrs. Eckley B. Coxe,
 Col. R. Bruce Ricketts,
 Gen. Paul A. Oliver,
 I. A. Stearns.
Lycoming county, Dr. B. H. Detwiler,
 Hon. J. Henry Cochran.
McKean county, F. H. Newell.
Mercer county, Jonas J. Pierce.
Montgomery county, Dr. J. M. Anders,
 B. Witman Dambly,
 Dr. H. M. Fisher,
 Dr. J. Newton Hunsberger,
 Prof. J. Shelly Weinberger,
 Dr. Samuel Wolfe.
Montour county, Isaac X. Grier.
Northampton county, Dr. Thomas M. Drown,
 Prof. T. C. Porter.
Northumberland county, G. R. Van Alen.
Perry county, Mrs. John Wister.
Philadelphia county, Hon. W. N. Ashman,
 Henry Budd,
 Henry Howson,
 Joseph W. Johnson,
 J. Rodman Paul,
 Albert B. Weimer,
 Dr. W. P. Wilson.
Pike county, Arthur M. Adams.
Potter county, Arthur B. Mann.
Schuylkill county, Wm. L. Sheaffer,
 Heber S. Thompson.
Somerset county, H. D. Moore, M. D.
Sullivan county, Hon. B. W. Jennings.
Susquehanna county, Edgar A. Turrell.
Tioga county, Charles Tubbs.
Union county, George G. Groff, M. D.
Venango county, Prof. C. A. Babcock.
Warren county, James O. Parmlee.
Washington county, Wm. Parkison Warne.
Wayne county, Alonzo T. Searle.
Westmoreland county, Hon. Lucien W. Doty.
Wyoming county, James W. Piatt.
York county, Dr. I. C. Gable.

LIST OF FARMERS' CLUBS IN THE STATE.

County.	Name of Club.	Name and Address of President.	Name and Address of Secretary.
Allegheny,	Gardeners' Association,	M. C. Dunlevy, Carnegie,	J. M. Handersfield, Green Tree.
	Farmers' Association,	M. E. Pile, Upper St. Clair,	Wm. Caldwell, Upper St. Clair.
Berks,	Oakdale,	Thos. J. C. Morrow, Hickman,	P. F. Humell, Oakdale.
Bradford,	Farmers' Union,	E. M. Zeers, Geigers's Mills,	H. C. Hoh, Birdsboro.
Chester,	Orwell's Farmers,	C. M. Beers,	Jas. E. Eastman, Orwell.
	West Grove,	Jos. T. Phillips, West Grove,	I. R. Chambers, Toughkenamon.
	Practical Farmers,	James Keech, Thorndale,	Mrs. Clara Webster, Hopewell.
	Doe Run,	G. C. Maule, Gum Tree,	Emma Maule, Rosewick.
Cumberland,	McCormick's,	James McCormick, Harrisburg,	James Coble, Shiremanstown.
Franklin,	Farmers' Association,	S. S. Leady, Marion,	J. C. Trotti, Marion.
Jefferson,	Washington Township,	Abel Thompson, Allens Mills,	J. F. Morrison, Allens Mills.
Lancaster,	Octoraro,	Edwin Chambers, Chatham,	Carrie W. Cummings, Chatham.
	Fulton,	Neale Hambleton, Goshen,	T. C. Evans, Furness.
Lawrence,	Farmers' Institute,	Samuel McCreary, Neshannock Falls,	H. M. Grigsby, New Castle.
Lycoming,	Muncy Valley,	E. W. McMichael, Hughesville,	A. C. Henry, Hughesville.
Lehigh,	Industrial Union,	John K. Fetherolf, Jacksonville,	W. H. Lang, Jacksonville.
	Horseshoe,	John Biting, Hosensack,	William Roeder, Hosensack.
	Limeport,	William Zaubach, Lenark,	Thomas Ott, Limeport.
	Buckport,	Milton Zimmerman, Seipstown,	Charles Schlonker, Seipstown.
	Pioneer Branch,	E. S. Rabenold, Wolferts,	C. Reichard, Wolferts.
	Hoffmansville,	Uriah Schuler, Orefield,	Milton Foters, Orefield.
Montgomery,	Horsham,	Howard Williams, Horsham,	William Smith, Pottstown.
	Farmers' Union,	Jesse S. Kreibel, Worcester,	W. W. John, Bear Gap.
Northumberland,	Farmers' Union,	J. H. Holderman, Pottstown,	Edot Geo. Sterns, Harford.
Potter,	Elysburg,	C. C. McWilliams, Elysburg,	Edot Geo. Sterns, Harford.
Washington,	Farmers' Association,	John Crooks, Muncyville,	W. H. Lang, Jacksonville.
	Clifford,	John G. Galle, Finleyville,	T. J. McChelland, Finleyville.
Hanover Township,	Citizens Co-operation,	C. Z. March, Rossville,	M. L. Brennenman, Wellsville.
York,	Warrington,		

List of County and Local Agricultural Societies, with Names and Addresses of Secretaries and Date for Holding Fall Exhibitions of 1900.

[Those marked with an * are represented in the Board of Agriculture by elected members.]

COUNTY.	Corporate Name of Society.	Name and Address of Secretary.	Where Held.	When Held.
	PENNSYLVANIA STATE AGRICULTURAL SOCIETY,.....	J. P. Nissley, Hummelstown,....	.....	.....
Adams,*	STATE HORTICULTURAL ASSOCIATION	E. B. Engle, Waynesboro',.....	.....	No fair.
Allegheny,*	GRANGERS' INTERSTATE PICNIC EXHIBITION,.....	R. H. Potts, Mechanicsburg,....	Williams' Grove,	Aug. 27, Sept. 1
Baldwin,*	MT. GRETNA AGRICULTURAL, MECHAN. & INDUS. EX.,	D. S. P. Hellman, Hellmandale, ..	Mt. Gretna,	Aug. 20-24.
Berks,*	PATRONS OF HUSBANDRY EXHIBITION	.....	Rhone Centre Hall,	Sept. 15-22.
Do.	PENNSYLVANIA STATE DAIRYMEN'S ASSOCIATION	G. H. St. John, Meadville, .....	.....	.....
Do.	Adams County Agricultural Association,	A. I. Weidner, Arendtsville,.....	.....	No fair.
Do.	Tarentum Fair Association,	J. C. Dunn, Tarentum, .....	.....	No fair.
Do.	Clinton Agricultural Association,	J. S. Burns, Clinton, .....	.....	Sept. 25-28.
Do.	Dayton Agricultural and Mechanical Association,	E. Morrow, Dayton,	Dayton,	Aug. 28-31.
Do.	Parker Tri-County Fair Association,	S. W. Coe, Parkers' Landing,.....	.....	.....
Do.	Kittanning Fair Association,	T. McConnell, Kittanning,.....	Kittanning, .....	.....
Do.	Beaver County Agricultural Society,	J. C. Martin, Beaver, .....	.....	No fair.
Do.	Mill Creek Valley Agricultural Society, Limited,	R. M. Swancy, Hookstown,	Hookstown,	Aug. 21-23.
Do.	Bedford County Agricultural Society,	Wm. I. Eicholtz,	Bedford,	Oct. 2-5.
Do.	Bedford County Agricultural Society,	Cyrus T. Fox, Reading,	Reading, .....	.....
Do.	Agricultural and Horticultural Association of Berks County,	J. E. Esser, Kutztown,	Kutztown,	Sept. 25-28.
Do.	Keystone Agricultural Society, .....	.....	.....	.....
Do.	Blair County Agricultural Society,	Frank H. Fay, Hollidaysburg,....	Hollidaysburg,	Sept. 11-14.
Do.	Bradford County Agricultural Society,	Ben. Kuykendall, Jr., Towanda, ..	Towanda,	Sept. 25-28.
Do.	Union Agricultural Association,	C. D. Derrah, Canton,	Canton,	Sept. 4-7.
Do.	Troy Agricultural Society,	Charles L. Fellows, Troy,	Troy,	Sept. 11-14.
Do.	Butler County Agricultural Society,	W. P. Roessing, Butler,	Butler,	Sept. 4-7.
Do.	Ebensburg Agricultural Society,	F. C. Sharbaugh, Ebensburg,....	Ebensburg,	Aug. 23-31.
Do.	Cambria County Agricultural Association,	J. V. Maucher, Carrolltown,....	Carrolltown,	Sept. 4-7.
Do.	Tri-County Agricultural and Dinosaur Park Association,	J. H. Laune, Johnstown, .....	.....	.....
Do.	Cameron County Agricultural Association,	N. A. Ostrum, Emporium, .....	.....	No fair.
Do.	Carbon County Industrial Society,	C. W. Bower, Lehighton,	Lehighton,	Sept. 25-28.

List of County and Local Agricultural Societies—Continued.

[Those marked with an * are represented in the Board of Agriculture by elected members.]

COUNTY.	Corporate Name of Society.	Name and Address of Secretary.	Where Held.	When Held.
Perry,*	Perry County Agricultural Society.	C. A. Diven, Newport.	Newport.	Sept. 13-21.
Philadelphia,*	Pennsylvania Horticultural Society.	David Rust, Philadelphia.	Philadelphia.	Nov. 13-17.
Potter,*	Potter County Agricultural and Horticultural Society.	C. L. Peck, Coudersport.	Coudersport.	No fair.
Do.	Farmers and Breeders' Association.	D. S. Lisbert, Coudersport.	Coudersport.	
Schuylkill,*	Orwigsburg Agricultural and Horticultural Society.	A. E. Brown, Orwigsburg.	Orwigsburg.	Aug. 23-31.
Do.	Ringtown Agricultural Society.	L. Applegate, Ringtown.	Ringtown.	
Somerset,*	Somerset County Agricultural Society.	H. T. Hoffman, Somerset.	Somerset.	
Sullivan,*	Sullivan County Agricultural Society.	O. N. Milne, Millview.	Millview.	Oct. 3-5.
Susquehanna,*	Susquehanna County Agricultural Society.	W. A. Tiltworth, Montrose.	Montrose.	Sept. 18-19.
Do.	Harford Agricultural Society.	E. E. Jones, Harford.	Harford.	Sept. 26-27.
Tioga,*	Cowanesque Valley Agricultural Society.	Frank Strong, Westfield.	Westfield.	Sept. 11-15.
Do.	Smvthe Park Association.	W. P. Austin, Mansfield.	Mansfield.	Sept. 25-28.
Do.	Unga County Pomona Grange.	H. Roblyer, Balsam.	Balsam.	No fair.
Union,*	Union County Agricultural Society.	C. Dale Wolfe, Bucknell.	Bucknell.	Sept. 26-29.
Venango,*	Venango County Agricultural Society.	James Miller, Franklin.	Franklin.	No fair.
Do.	Oil City Fair and Trotting Association.	I. N. Hinderliter, Oil City.	Oil City.	Sept. 11-14.
Washington,*	Western Pennsylvania Agricultural Association.	Jas. S. Forsythe, Washington.	Washington.	Sept. 25-28.
Do.	Union Agricultural Association.	E. P. Stevenson, S. Burgettstown.	Burgettstown.	Oct. 2-4.
Wayne,*	Wayne County Agricultural Society.	E. W. Gammell, Bethany.	Bethany.	
Westmoreland.	Westmoreland Agricultural Society.	W. F. Holtzer, Greensburg.	Greensburg.	Sept. 18-21.
Wyoming,*	Wyoming County Agricultural Society.	W. N. Reynolds, Tunkhannock.	Tunkhannock.	Sept. 19-21.
York,*	York County Agricultural Society.	E. Chapin, York.	York.	Oct. 1-5.
Do.	Hanover Agricultural Society.	M. O. Smith, Hanover.	Hanover.	Sept. 25-28.

Note.—Where dates are omitted, no replies to requests for same were received by this Department.

THE PENNSYLVANIA STATE POULTRY ASSOCIATION.

OFFICERS FOR 1901.

PRESIDENT.

Norris G. Temple,Pocopson.

VICE PRESIDENT.

A. G. Arnold,Dillsburg.

SECRETARY.

Frank P. Rogers,West Chester.

TREASURER.

G. M. Woods,Leaman Place.

BOARD OF DIRECTORS.

J. Emlen Smith,Chestnut Hill.

Wm. H. Kendig,Newville.

Walter R. Hibberd,Frazer.

Chas. T. Cornman,Carlisle.

W. M. Benninger,Mt. Gretna.

COMMITTEES.

Executive Committee.

Norris G. Temple,Pocopson.

F. P. Rogers,West Chester.

G. M. Woods,Leaman Place.

And Board of Directors.

Legislative Committee.

Norris G. Temple,Pocopson.

A. G. Arnold,Dillsburg.

THE PENNSYLVANIA STATE POULTRY ASSOCIATION.

Constitution.

ARTICLE I.

The name of the corporation shall be "The Pennsylvania State Poultry Association."

ARTICLE II.

The object of this corporation shall be to encourage and promote improvement in the breeding and the management of poultry, pigeons and game, and the preservation and protection of the latter; to ascertain by experiment and to collect and disseminate reliable and practical information relating thereto; to work in unison with the State Board of Agriculture, and if possible with all poultry and agricultural societies throughout this State; to recommend competent persons as judges, to furnish advice when called upon and to settle disputes that may occur at poultry shows.

ARTICLE III.

The principal place of business of said corporation shall be in Pocopson, Chester county, with branch offices in Philadelphia, Harrisburg and Carlisle, Pennsylvania.

ARTICLE IV.

The said corporation shall have perpetual existence.

ARTICLE V.

This corporation shall consist of such persons as shall signify in writing their desire to become members and shall pay on application one (\$1) dollar as membership fee and one (\$1) dollar as yearly dues and shall present their application in writing to the secretary, who shall issue a certificate of membership.

ARTICLE VI.

The officers of this corporation shall be a president, first vice president, secretary, treasurer, and five (5) directors (three-fifths of said directors to be practical poultry raisers) and one (1) vice president for

each county, represented by membership in the corporation, who shall be elected by ballot, by a majority vote of the qualified members at the annual meeting, and shall serve one year, or until their successors are elected.

ARTICLE VII.

The annual meeting of the corporation shall be held in the city of Harrisburg on the first Tuesday preceding the fourth Wednesday in January, each year, at such time and place as the executive committee may direct.

ARTICLE VIII.

Any officer or member may be censured, suspended or expelled from the corporation for neglect of duty, unfair dealing, wilful misrepresentation or dishonesty in matters connected with the objects of the corporation, such censure, suspension or expulsion requiring a vote of all the members present at a meeting called for that purpose, thirty (30) days notice in writing having been given each member by the secretary.

ARTICLE IX.

Any member upon the payment of fifteen (\$15) dollars at any one time shall be constituted a life member and shall be exempt from the payment of any further dues.

PENNSYLVANIA DAIRY UNION.

OFFICERS FOR 1901.

PRESIDENT.

Joseph C. Sharpless,London Grove.

FIRST VICE PRESIDENT.

F. K. Taylor,Granville Centre.

SECOND VICE PRESIDENT.

Archie Billings,Edinboro.

TREASURER.

S. F. Barber,Harrisburg.

SECRETARY.

S. F. Barber,Harrisburg.

BOARD OF DIRECTORS.

H. W. Comfort,Fallsington.

C. L. Peck,Coudersport.

J. C. Sharpless,London Grove.

S. Neiderriter,Marble.

L. D. May,Granville Centre.

C. J. Follet,Katan.

NOTE.—The Secretary was unable to give the minutes of the meeting held at Corry in 1900. Before the close of the meeting the following gentlemen were named as delegates to the meeting of the State Board of Agriculture, to be held in January:

Messrs. J. C. Sharpless, H. W. Comfort, L. D. May and C. L. Peck.

The following resolution was offered by Mr. Moore:

Resolved, That the committee consisting of S. F. Barber, W. H. Comfort, C. P. Faucett, P. M. Sharpless and Archie Billings, appointed to investigate the dairy needs of the State of Pennsylvania be continued, and that this organization bear part of the expense of postage necessary to carry out its report.

STATE HORTICULTURAL ASSOCIATION OF
PENNSYLVANIA.

OFFICERS FOR 1901.

PRESIDENT.

Howard A. Chase,Philadelphia.

VICE PRESIDENTS.

Calvin Cooper,Bird-in-Hand.
Hon. W. T. Creasy,Catawissa.
M. C. Dunlevy,Carnegie.

RECORDING SECRETARY.

Enos B. Engle,Waynesboro.

CORRESPONDING SECRETARY.

Wm. P. Brinton,Christiana.

TREASURER.

Samuel C. Moon,Morrisville.

CONSTITUTION AND BY-LAWS OF THE STATE HORTICULTURAL ASSOCIATION OF PENNSYLVANIA.

Article 1. This society shall be entitled "The State Horticultural Association of Pennsylvania," and its object shall be the advancement of the science of horticulture and pomology.

Article 2. Any person may become a member of this society by a vote of a majority of the members present at any meeting, and by paying into the treasury the sum of one dollar annually; or the payment of one dollar to the treasurer, at any time, shall constitute membership, and entitle said member to a copy of the proceedings. The payment of ten dollars at one time will constitute life membership.

Article 3. Its officers shall consist of a president, three vice presidents, recording and corresponding secretary and a treasurer, all of whom shall be elected annually by ballot.

Article 4. The following committees shall be appointed: A committee of five on nomenclature; a committee of three on insects, of whom the professor of entomology shall be chairman; an executive committee consisting of the elective officers of this association and three of whom, including the president, shall constitute a quorum; and a general fruit committee, consisting of one from each county represented, with a general chairman of the whole, each member of the fruit committee to have the privilege of appointing two assistants.

Article 5. The society may, at any time, elect honorary members.

Article 6. The society may, from time to time, appoint professors on entomology, botany, horticultural chemistry and geology.

Article 7. This constitution may be altered or amended by a vote of two-thirds of the members present at any regular meeting, notice of the proposed amendment, in writing, having been previously given.

Article 8. Seven members shall constitute a quorum for the transaction of business.

BY-LAWS.

Article 1. The committee on nomenclature shall collate and decide the standard and synonymous names of all fruit known in the society with the authorities for each, and report, so far as practicable,

at each regular meeting, and record the same in a book kept for that purpose.

Article 2. The general fruit committee shall carefully and thoroughly investigate the subject of fruit culture in general. Each local committee of three shall collect such useful and interesting information in relation to the subject as may be in their power, and embody the same in monthly reports, to be made to the general chairman; such reports to be by him examined and embodied in his annual and semi-annual reports. Also that the said county committee shall form ad interim committees for their respective counties, and further that said ad interim committees are hereby authorized to publish the reports in the "Gardener's Monthly," or such other paper, as they may select, the same having been first submitted to the chairman of the general fruit committee for his approval: Provided, That said publication shall be free of expense to the association.

Article 3. The annual meeting of the association shall be held on Tuesday before the third Wednesday of January of each year, at such a place as the executive committee may appoint, at which time the election for officers shall take place; said officers to serve from the close of the meeting at which they are elected to the close of the succeeding annual meeting, at which an exhibition and discussion of fruits shall take place and other business transacted in the following order:

- 1st. Reading of minutes of previous meeting.
- 2d. Roll call and dues collected.
- 3d. Election of officers.
- 4th. Reports of officers.
- 5th. Reports of standing committees.
- 6th. Reports of special committees.
- 7th. Unfinished business of former meeting.
- 8th. New business.

The nomination and election of new members shall be in order at any time during the session.

Article 4. Other meetings may be convened by the executive committee at such time and place as they may appoint.

Article 5. No member who is in arrears for dues shall be eligible for any office, or serve on any standing committee; and any member who shall neglect to pay his dues shall cease to enjoy the privileges of membership.

PROGRAMME OF THE FORTY-FIRST ANNUAL
MEETING OF THE STATE HORTICULTURAL
ASSOCIATION OF PENNSYLVANIA, HELD IN
OLD CITY HALL, PITTSBURG, PA., JANUARY
16 AND 17, 1900.

ORDER OF BUSINESS.

Tuesday, January 16, 9.30 A. M.

1. Opening Announcement.
2. Address of Welcome, Hon. Wm. Diehl, Mayor of Pittsburg.
3. Reading of Minutes of Previous Meeting.
4. Roll Call and Collection of Dues.
5. Election of Officers.
6. Reports of Officers.
7. Reports of Standing Committees.
8. Appointment of Standing Committees.

Tuesday, January 16, 2.00 P. M.

10. Report of General Fruit Committee,
H. C. Snavelly, Chairman, Lebanon, Pa.
11. Strawberry Culture,
J. W. Allison, Mercer, Pa.
12. Is it Advisable to Grow Small Fruits in Young Orchards?
W. B. K. Johnson, Allentown, Pa.
13. Some Things Essential to Success in Horticulture,
D. W. Lawson, Dayton, Pa.
14. Some Points in Door-Yard Planting and Decoration,
L. B. Pierce, Tallmadge, O.
15. Question Box.

Tuesday, January 16, 7.30 P. M.

16. Music, "Robin Adair," (Arr. by Buck),
Christ M. E. Church Quartette.
 17. President's Annual Address,
Prof. S. B. Helges, York, Pa.
 18. Music, "Excelsior," (Balfe). Duet
Duet by Messrs. Stevenson and Brockett.
 19. Some Famous Orchards I Have Visited, Including an Account of the Insect Foes,
Prof. W. G. Johnson, Professor of Entomology,
Maryland Agricultural College, College Park,
Md. (This lecture was illustrated by views from
a magic lantern.)
 20. Music, "Sweet and Low,"
Barnaby Quartette.
-

Wednesday, January 17, 9.30 A. M.

21. Report of Committees.
 22. Unfinished and New Business.
 23. Peach Growing in Western Pennsylvania,
D. McCollum, Washington, Pa.
 24. Ornamental Horticulture,
Wm. H. Moon, Morrisville, Pa.
 25. Advancement of Floriculture in Allegheny County the Past Forty Years,
P. S. Randolph, Pittsburg, Pa.
 26. The Packing and Shipping of Fruit from a Commission Merchant's Standpoint,
Thos. Renton, Castle Shannon, Pa.
-

Wednesday, January 17, P. M.

27. Potato Culture,
Hon. Alva Agee, Cheshire, O.
28. General Observations on Fruit Growing,
Howard A. Chase, Philadelphia, Pa.
29. Crown-Gall of Apple and Peach Trees,
Prof. George C. Butz, Professor of Horticulture,
State College, Pa.

30. Selection of Varieties; How to Plant, Pick and Store the Apple,

Hon. W. R. Barnhart, Greensburg, Pa.

31. Should Our Legislature Enact a Law Regulating the Shape and Size of Fruit Packages?

For General Discussion.

SUBJECTS FOR DISCUSSION.

32. Can Hill Culture of Strawberries Be Made Profitable on an Extensive Scale?
33. What is the Proper Season to Prune Grape Vines?
34. What is the Most Favorable Soil and Location for a Peach Orchard?
35. Name the Hardest and Best Varieties of Strawberries for General Culture.
36. Best Vines for Home Adornment.
37. Shall Pennsylvania Fruits Be Represented at the Paris Exposition in 1900?
38. The Canker Worm. What Are Its Habits and the Best Methods of Destroying It?
39. What Can Be Done in Pennsylvania to Secure a More Perfect Nomenclature in Fruit? Should Misnamed Varieties, Although Best Entered for Competition, Be Ignored by Judges at Fairs, or Should the Proper Names Be Affixed and Prizes Awarded?
40. Finely Ground Bone Meal Applied to Small Fruit Plants in May Has Proven Very Satisfactory, but Some Recommend Liquid Manure. Which Is Preferable and Most Advantageous?
41. What Are the Best Varieties of Apples to Plant for a Commercial Orchard in Pennsylvania? The Fruit Is to Be Shipped to Philadelphia and Pittsburg Markets.
42. Fruit Trees and Vines Were More than Usually Exempt During the Past Year from Ravages of Injurious Insects. Can this Be Attributed to the Spraying Done in Previous Years, or Was It Due to Climatic Conditions?
43. Can the Evaporating of Fruit and Other Products Be Made Profitable in Pennsylvania?
44. Is the Horticulturist and Fruit Grower Reaping His Just Share of the Prosperity that Is Abroad in the Land? If not, Why?
45. Has Floriculture Received the Attention and Encouragement that It so Fully Merits? Can not this Society Devise Some Plans to Increase the Interest in this Popular Branch of Horticulture?
46. Should the Ben Davis Apple Be Planted in Pennsylvania?
47. What Are the Best Hardy Roses for General Cultivation?

48. In View of the Fact that the State Makes Liberal Appropriations for the Education of Farmers Through the Medium of "Farmers' Institutes," Would It not Be Perfectly Right and Proper that at Least a Small Amount Should Be Devoted to Horticulture, the Amount to Be Judiciously Expended by the State Horticultural Association?

MEMBERSHIP.

LIFE MEMBERS.

Bartram, J. Hibberd, Milltown, Chester Co.
Brinton, Wm. P., Christiana, Lancaster Co.
Chase, Howard A., 1430 S. Penn Square, Philadelphia.
Chase, Charles T., 1430 S. Penn Square, Philadelphia.
Calder, Dr. James, Harrisburg, Dauphin Co. (deceased).
Cornelius, Robert, Philadelphia.
Engle, Henry M., Marietta, Lancaster Co. (deceased).
Engle, John G., Marietta, Lancaster Co.
Engle, Enos B., Waynesboro, Franklin Co.
Ermentrout, Hon. Jas. N., Reading, Berks Co.
Fox, Cyrus T., Reading, Berks Co.
Garrettson, Joel V., Floradale, Adams Co.
Good, C. W., Waynesboro, Franklin Co.
Hayes, Charles P., Philadelphia.
Heyser, Jacob, Chambersburg, Franklin Co.
Hildrup, W. T., Harrisburg, Dauphin Co.
Hacker, William, Philadelphia.
Hiller, Casper, Conestoga, Lancaster Co. (deceased).
Hiller, Peter C., Conestoga, Lancaster Co. (deceased).
Landis, Israel, Lancaster, Lancaster Co.
Hoopes, Josiah, West Chester, Chester Co.
Landis, Israel, Lancaster, Lancaster Co.
McCormick, Harry, Harrisburg, Dauphin Co.
McCormick, James, Harrisburg, Dauphin Co.
Martin, J. O., Mercersburg, Franklin Co.
Meehan, S. Mendelson, Germantown, Philadelphia Co.
Pannebaker, Wm. N., Lewistown, Mifflin Co.
Reist, Peter S., Lititz, Lancaster Co.
Scribner, Prof. F. Lamson, Knoxville, Tenn.
Shaffner, Jacob, Harrisburg, Dauphin Co.
Swift, Rev. E. P., Mt. Oliver, Allegheny Co.
Thomas, George B., West Chester, Chester Co.
Thomas, Edwin W., King-of-Prussia, Montgomery Co.
VanDeman, H. E., Parksley, Accomac Co., Va.
Wertz, D. Maurice, Quincy, Franklin Co.

HONORARY MEMBERS.

Barry, P., Rochester, N. Y. (deceased).
 Downing, Charles, Newburgh, N. Y. (deceased).
 Ellwanger, George, Rochester, N. Y.
 Edge, Thomas J., Harrisburg, Pa.
 Garber, J. B., Columbia, Pa. (deceased).
 Heiges, Prof. S. B., York, Pa.
 Meehan, Thomas, Germantown, Pa.
 Michener, Dr. E., Toughkenamon, Pa. (deceased).
 Parsons, Prof. S. B., Flushing, N. Y.
 Parry, William, Parry, N. J. (deceased).
 Rathvon, Prof. S. S., Lancaster, Pa. (deceased).
 Rowe, Hon. D. Watson, Chambersburg, Pa.
 Rutter, John, West Chester, Pa. (deceased).
 Saunders, Wm., Washington, D. C. (deceased).
 Stitzel, George D., Reading, Pa.
 Thomas, John J., Union Springs, N. Y. (deceased).
 Warder, Dr. John A., North Bend, O. (deceased).
 Wilder, Marshall P., Boston, Mass. (deceased).
 Wickersham, Dr. J. P., Lancaster, Pa.
 Willetts, Rev. Dr., Philadelphia, Pa.

ANNUAL MEMBERS.

Achelis, George, West Chester.	Carter & Son, J. I., Chatham.
Adams, Wm., Enslow.	Clark, M. N., Claridge.
Allison, J. W., Mercer.	Clemson, J. W., Halifax.
Ammarell, Charles, Reading.	Collins, R. A., Rodi.
Armsby, Dr. H. P., State College.	Comfort, H. W., Fallsington.
Baker, Dr. A. C., West Chester.	Cooper, Calvin, Bird-in-Hand.
Balderston, John L., Kennett Square.	Creasy, Hon. W. T., Catawissa.
Barnhart, Hon. W. R., Greensburg.	Darlington, Frank P., West Chester.
Bartram, Frank, Stephen Girard Building, Philadelphia.	Davis, W. H. H., West Chester.
Bickel, Isaac, Reading.	Day, Theodore, Dyberry.
Bolton, W. P., Hopechurch.	Derr, Cyrus G., Reading.
Bone, George, Thorndale.	Demming, H. C., Harrisburg.
Bockstose, Wm., Castle Shannon.	Dickson, John, Mt. Lebanon.
Border, Wm., Reading.	Dunn, Henry J., Reading.
Boyd, M. H., Atglen.	Dunlevy, M. C., Carnegie.
Boyd, E. L., Connellsville.	Engle, Ezra B., Marietta.
Bracken, J. W., Hollidaysburg.	Erb, Amos H., Lititz.
Breneiser, Sr., Charles, Reading.	Fergus, W. P., Mustard.
Brenneman, J. D., Harrisburg.	Fink, Fredk., Green Tree.
Briggs, W. H., Carrick.	Fleming, J. W., Farmers' Deposit Na- tional Bank, Pittsburg.
Brinser, E. C., Middleton.	Foster, C. A., Carnegie.
Brumbaugh, A. J., Reading.	Foster, T. C., Harrisburg.
Bucher, Dr. J. Riley, Lebanon.	Fryer, W. J., Woodside.
Butz, Prof. Geo. C., State College.	Grant, Jeremiah K., Reading.
Burkey, Joshua R., Reading.	Gearing, H. C., 2000 Sidney St., Pitts- burg.
Burns, J. S., Clinton.	Hamilton, Prof. John, Harrisburg.
Bromell, J. Horace, Cheyney.	Hall, E. H., West Chester.
Carnahan, M., Carnegie.	

- Harnish, H. H. Hubers.
Harris, L. C., Perryopolis.
Harrison, Orlando, Berlin, Md.
Handenshield, J. E., Carnegie.
Hawley, Jesse G., Reading.
Hiester, Gabriel, Harrisburg.
Herr, Joel A., Cedar Springs.
Herr, Danl. D., Lancaster.
Herr, Alders J., Lampeter.
Hirschinger, John, Enslow.
Hoke, David, Hanover.
Hochberg, Wm., Whiteash.
Hochberg, Jacob, Job.
Hormel, P. T., Oakdale.
Ingram, E. T. West Chester.
Jamison, J. E., Swales.
Johnson, W. B. K., Allentown.
Johnson, R. F., Carnegie.
Keller, Col. D. C., Reading.
Keppel, Samuel B., Sinking Spring.
Kready, John, Mt. Joy.
Koons, Dr. P. R., Mechanicsburg.
Leer, Samuel W., Woodville.
Leinbach, Joseph A., Reading.
Leinbach, Geo. A., Reading.
Longsdorf, C. L., Floradale.
Longsdorf, D. E., Mechanicsburg.
Long, H. R., Mt. Lebanon.
Lutz, Frank, Gayly.
McGowan, J. G., Geigers' Mills.
McGowan, Howard G., Geiger's Mills.
McFarland, J. Horace, Harrisburg.
McKenna, John, Green Tree.
Marshall, Mrs. J. L., 239 Fourth Avenue, Pittsburg.
Mashey, Mrs. Geo., 6736 Penn Ave., Pittsburg.
Meehan, Thos. B., Germantown.
Merritt, Hon. Thos. P., Reading.
Miller, J. W., Tippecanoe.
Moon, Wm. H., Morrisville.
Moon, Samuel C., Morrisville.
Morrow, Thos. J. E., Hickman.
Murray, J. K., Pottsgrove.
Myers, A. D., Altoona.
Neil, John, Cannonsburg.
Ort, Henry, Lewistown.
Obold, John H., Reading.
Patterson, J. G., Stewartstown.
Peters, Earl, Uriah.
Persing, E. E., Sunbury.
Philip, George, Mt. Lebanon.
Pyle, J. W., Willowdale.
Rakestraw, Thos., Willowdale.
Rife, Jacob L., West Fairview.
Roesler, F., Carnegie.
Rupp, D. C., Shiremanstown.
Rupp, Jno. F., Shiremanstown.
Root, A. W., East Petersburg.
Rush, J. G., West Willow.
Schaeffer, Dr. N. C., Lancaster.
Scheick, Jacob, Carrick.
Scott, J. W., 3 Union St., Pittsburg.
Scott, John, Cliffmire.
Sellers, H. W., Bailey Ave., Pittsburg.
Seyler, D. M., Basket.
Scheidy, Danl., Pine Grove.
Shaffer, Dr. J. A., Carnot.
Schock, Oliver D., Hamburg.
Snavelly, H. C., Lebanon.
Smith, Paul, Beadling.
Shimer, A. S., Redington.
Sohn, Henry, Woodlawn.
Stalze, John R., Library.
Strachan, Wm., Banksville.
Stahle, Col. J. A., Emigsville.
Scholl, Calvin P., Fisherville.
Shearer, Joseph, Reading.
Smeych, Danl., Lancaster.
Stein, Geo. E., Craley.
Sites, J. Landis, Ridge Ave., Harrisburg.
Stout, Wm. H., Pine Grove.
Thomas, Joseph W., King-of-Prussia.
Tucker, O. M., 1114 Franklin Ave., Pittsburg.
Wagner, Geo. A., Alinda.
Wakefield, S. M., Redstone.
Wallize, H. C., Sunbury.
Wentzel, Aug. L., Reading.
Williamson, E. C., Morrisville.
Williams, Dr. C. C., 24 Washington Ave., Pittsburg.
Wild, Wm., Carrick.
Woods, T. A., Harrisburg.
Zigler, Amos, Rowenna.
Zerr, E. M., Geigers Mills.

MINUTES OF THE ANNUAL MEETING OF THE STATE HORTICULTURAL ASSOCIATION OF PENNSYLVANIA.

HELD AT PITTSBURG, PA., JANUARY 16 AND 17, 1900.

Pittsburg, January 16, 1900.

The Forty-first Annual Meeting of the State Horticultural Association of Pennsylvania was held at Pittsburg, Pa., January 16 and 17, 1900.

After some preliminary work in the arrangements of decorations and exhibits, and a pleasant interchange of greetings between the members from the eastern sections of the State and their friends from Allegheny county and vicinity, the meeting was called to order for business at 11 o'clock, by President Heiges, who expressed his great pleasure in meeting for the first time so many enthusiastic horticultural friends west of the Allegheny mountains and hoped for a pleasant and profitable meeting. He took pleasure in introducing Mayor Wm. J. Diehl, of Pittsburg, who cordially welcomed the members, as follows:

ADDRESS OF WELCOME BY MAYOR W. J. DIEHL.

"Gentlemen of the State Horticultural Society of Pennsylvania: Without indulging in the formality of any prefatory remarks, I bid you a most hearty welcome to Pittsburg, and on behalf of the citizens extend to you the cordial hand of hospitality, with the sincere hope that your stay among us will be an extremely pleasant and enjoyable one. I feel certain that those to whom your care has been entrusted, the local committee of arrangements, will do all in their power to make it so, and that they will succeed to your entire satisfaction I haven't the least doubt.

"While Pittsburg cannot boast of being anything great in the way of a fruit raiser, it is a wonderful producer in the industrial line, leading the world in that, and all that has made Pittsburg, spreading its fame to every inhabitable part of the globe, is open for your inspection, and will certainly well repay that inspection. But we Pittsburgers are big consumers of fruit, and excellent customers for the fruit grower, while at the same time we count the fruit growers among our very best friends for the good things of life which they

supply us with in such abundance and luscious quality. Therefore, it is that we are glad to have you with us, and to give you the opportunity of sampling Pittsburg's hospitality, which has the general reputation of being about the best to be met with in the land. It has been about 35 years now, I believe, since Pittsburg has had the pleasure of entertaining the State Horticultural Society of Pennsylvania, it being that long ago when the society last met in this city. For that reason we want to make your present visit with us a memorable one in every respect, and desire that when you leave us for your homes at the conclusion of the business which draws you here, you will take away with you the most pleasant remembrances of your visit to Pittsburg as well as the united opinion that your forty-first annual meeting was the very best in the history of your honorable society.

"The more plentiful our supply of fruit is the more healthful, as well as the longer and the happier life it means for us all, so that humanity is greatly indebted to the fruit grower, one of the grandest as well as one of the most grateful and beneficial enjoyments of life. Despite, therefore, the evil brought upon mankind as the result of Eve eating the forbidden fruit, mankind has been very largely blessed by the labors of the fruit grower.

"Once more bidding you a very cordial welcome to Pittsburg, I will say good morning, and leave you to the hospitable care of the Gardeners' and Fruit Growers' Association of Allegheny County and the Florists' Club of Pittsburg, your particular hosts during your stay in the city, with the firm belief that they will do as well by you in making your visit a pleasant one as we all expect them to."

RESPONSE TO ADDRESS OF WELCOME, BY PRESIDENT S. B. HEIGES.

In behalf of our society, Mr. Mayor, it affords me great pleasure to accept your cordial and hospitable welcome. I have been a member of this Association for 37 years. It was organized as the "Fruit Growers' Society of Eastern Pennsylvania," and we now realize that we ought years ago to have made greater efforts to awaken an interest in our work in the western part of the State.

I do not know a better field for horticulture and fruit growing than Western Pennsylvania. I have been in institute work, both farmers' and teachers', in every county of the Commonwealth. I have served on the State Board of Agriculture in the State, and I know there are immense fields open for the energetic and industrious horticulturist. I have made this question somewhat of a study, and

throwing aside all prejudice, I know of no State where conditions of soil and climate are more favorable than in Pennsylvania. We have lowlands, hillsides, high mountains, hilltops and plateaus where are grown every variety of fruits and crops known to the temperate zone.

Yours is a historic town, and it is known to everyone who has read the early history of our State as "Fort Duquesne," or Fort Pitt. Here one of the English generals lost his life. Your greatness depends upon your varied and extensive manufactures. You are the "Birmingham of America" and you have great markets here that should be supplied from the surrounding country. Again, Mr. Mayor, I trust you will accept our thanks for your cordial welcome.

MINUTES.

The Secretary read the minutes of the last annual meeting which were approved.

The President announced that everyone interested in agriculture, horticulture or the objects of our society will be welcomed as members. The fee of annual membership is one dollar; life membership, ten dollars. We have the promise of Secretary Hamilton that the reports of our proceedings will be printed by the State, and every member will be entitled to a copy. These reports usually have illustrations of the new and valuable fruits of Pennsylvania origin. I have recently looked up the records and found that 253 varieties of apples originated in this State.

After a short recess to enable those wishing to become members to enroll their names, business was resumed and Treasurer Moon read the following list of those who desired to be enrolled as members:

LIFE MEMBERS.

Charles T. Chase.

S. Mendelson Meehan.

ANNUAL MEMBERS.

William Adams.

J. W. Allison.

W. R. Barnhart.

Wm. Bockstoce.

E. L. Boyd.

W. H. Briggs.

J. S. Burns.

M. Carnahan.

M. N. Clark.

R. A. Collins.

H. W. Comfort.

John Dickson.

M. C. Dunlevy.

J. W. Fleming.

W. P. Fergus.

Frederick Fink.

C. A. Foster.

Wm. J. Fryer.

H. C. Gearing.

C. W. Good.

L. C. Harris.

H. H. Harnish.

J. E. Handenshield.

S. B. Heiges.

Daniel D. Herr.

John Hirschinger.

P. T. Hormel.	Thos. Rakestraw.
Jacob Hochberg.	D. C. Rupp.
William Hochberg.	Jacob L. Rife.
W. B. K. Johnson.	F. Roessler.
R. F. Johnson.	Dr. J. A. Shaffer.
Saml. W. Lee.	Col. J. A. Stahle.
H. R. Long.	H. C. Snively.
D. E. Longsdorf.	Wm. Strachan.
Frank Lutz.	H. W. Sellers.
John McKenna.	Jacob Scheick.
Mrs. J. L. Marshall.	Paul Smith.
Mrs. Geo. Mashey.	John Scott.
James G. McGowan.	John R. Staltze.
J. W. Miller.	O. M. Tucker.
Wm. H. Moon.	William Wild.
S. C. Moon.	Edward Williamson.
Thos. J. E. Morrow.	Henry Sohn.
John Neil.	I. W. Scott.
Geo. A. Philips.	S. M. Wakefield.
J. W. Pyle.	C. C. Williams, M. D.

On motion the aforementioned were elected members of the association.

Messrs. Wm. H. Moon, Dan'l D. Herr and J. S. Burns were appointed a committee to nominate candidates for the several offices for the coming year.

The following additional committees were named by the Chair.

To Select Place for Next Annual Meeting: Howard A. Chase, H. C. Snively and J. W. Miller.

Auditing Committee: D. C. Rupp, J. W. Pyle, H. H. Harnish.

Nomenclature: W. B. K. Johnson, M. C. Dunlevy, Thos. Rakestraw, A. C. Rineman.

Deceased Members: J. S. Burns, J. E. Handenshield, H. R. Long.

Final Resolutions: W. R. Barnhart, J. W. Miller, M. C. Dunlevy.

Adjourned.

Afternoon Session, January 16, 1900.

The Association having been called to order by the President, Mr. Wm. H. Moon submitted the following list of officers for 1900:

PRESIDENT.

Howard A. Chase,Philadelphia.

VICE PRESIDENTS.

Calvin Cooper,Bird-In-Hand.

Daniel D. Herr,Lancaster.

M. C. Dunlevy,Carnegie.

RECORDING SECRETARY.

E. B. Engle,Waynesboro.

CORRESPONDING SECRETARY.

Wm. P. Brinton,Christiana.

TREASURER.

Samuel C. Moon,Morrisville.

On motion, the report of committee was accepted and the afore-named were duly elected by ballot.

The names of the General Fruit Committee were then read, as follows:

GENERAL FRUIT COMMITTEE.

Henry C. Snavelly, Chairman, Lebanon, Pa.

Adams county,C. L. Longsdorf,Floradale.
 Allegheny county,J. E. Handenshield,Carnegie.
 Armstrong county,J. Donaldson,Kittanning.
 Beaver county,A. L. McKibben,Green Garden.
 Bedford county,N. Clay Lutz,Bedford.
 Berks county,Howard G. McGowan,Geiger's Mills.
 Blair county,Fredk. Jaekel,Hollidaysburg.
 Bradford county,R. M. Willes,Towanda.
 Bucks county,Wm. H. Moon,Morrisville.
 Butler county,W. H. H. Riddle,Butler.
 Cambria county,M. L. Makin,Johnstown.
 Cameron county,F. G. Judd,Emporium.
 Carbon county,E. Bauer,East Mauch Chunk.
 Centre county,Geo. C. Butz,State College.
 Chester county,Thos. Rakestraw,Willowdale.
 Clarion county,G. T. Henry,Piollet.
 Clearfield county,Samuel Hall,McGee's Mills.
 Clinton county,Joel A. Herr,Cedar Springs.
 Columbia county,J. L. C. Cline,Benton.
 Crawford county,Jas. Turner,Meadville.
 Cumberland county,Jno. F. Rupp,Shiremanstown.
 Dauphin county,Gabriel Hlester,Harrisburg.
 Delaware county,Joseph H. Paschall,Ward.
 Elk county,Frank Simpson,Ridgway.
 Erie county,L. G. Young,Northeast.
 Fayette county,Prof. J. M. Hantz,Merrittstown.
 Forest county,C. A. Randall,Tionesta.
 Franklin county,C. W. Good,Waynesboro.
 Fulton county,Clem Chestnut,Hustontown.
 Greene county,L. W. Gwynne,Carmichaels.
 Huntingdon county,Geo. W. Owens,Birmingham.
 Indiana county,S. M. McHenry,Indiana.
 Jefferson county,J. N. Kelly,Grange.
 Juniata county,J. E. Jamison,Swales.

Lackawanna county, . . .	H. W. Northup,	Glenburn.
Lancaster county,	Calvin Cooper,	Bird-in-Hand.
Iawrence county,	Samuel McCreary,	Neshannock Falls.
Lebanon county,	H. C. Snively,	Lebanon.
Lehigh county,	W. B. K. Johnson,	Allentown.
Luzerne county,	P. Sutton,	Exeter.
Lycoming county,	Peter Reeder,	Hughesville.
McKean county,	D. C. Young,	Smethport.
Mercer county,	A. B. Greenlee,	New Lebanon.
Mifflin county,	D. E. Notestine,	Lewistown.
Monroe county,	R. F. Schwarz,	Analomink.
Montgomery county,	Jno. P. Fredd,	Pottstown.
Montour county,	J. K. Murray,	Pottsgrove.
Northampton county,	A. S. Shimer,	Redington.
Northumberland county,	W. L. Nesbit,	Lewisburg.
Perry county,	George A. Wagner,	Alinda.
Philadelphia county,	S. Mendelson Meehan,	Germantown.
Pike county,	John H. VanEtten,	Milford.
Potter county,	E. O. Austin,	Austin.
Schuylkill county,	W. H. Stout,	Pinegrove.
Snyder county,	Jno. F. Boyer,	Mt. Pleasant Mills.
Somerset county,	O. P. Shaver,	Friedens.
Sullivan county,	Jno. W. Rodgers,	Forksville.
Susquehanna county,	C. W. Brodhead,	Montrose.
Tioga county,	S. M. Baker,	Brookfield.
Union county,	I. N. Glover,	Vicksburg.
Venango county,	J. J. Will,	Franklin.
Warren county,	W. Cowan,	Warren.
Washington county,	Pressley Leech,	Bulger.
Wayne county,	Theodore Day,	Dyberry.
Westmoreland county,	A. Ruth,	Scottdale.
Wyoming county,	Wm. D. Avery,	Tunkhannock.
York county,	Col. J. A. Stahle,	Emigsville.

A paper entitled "Strawberry Culture," was read by J. W. Allison.

"Is It Advisable to Grow Small Fruits in Young Orchards," was then read by W. B. K. Johnson.

After some remarks on Mr. Johnson's paper, L. B. Pierce, of Tallmadge, Ohio, discussed, "Some Points in Door-Yard Planting and Decoration," which was very practically illustrated by sketches on the blackboard.

On motion adjourned.

Evening Session, January 16, 1900.

One of the most entertaining and enjoyable attractions of the evening session was the delightful music furnished by a talented quartette. The opening selection "Robin Adair." was received with rounds of applause.

The addresses of the evening by Prof. Heiges, Secretary Hamilton, and P. S. Randolph, were all extempore, and were well worthy a report in full, instead of the brief synopsis of each which is given.

The first speaker of the evening was President Heiges.

At the close of President Heiges' very excellent address, P. S. Randolph, of Pittsburg, gave an interesting talk on "The Advancement of Flori-Culture in Allegheny County the Past Forty Years."

President Heiges then introduced Prof. John Hamilton, Secretary of Agriculture, who made an Address on "Pennsylvania as a Fruit-Growing State."

On motion adjourned.

Wednesday Morning Session, January 17, 1900.

After being called to order, Mr. Chase, Chairman of Committee to select a place for next annual meeting, reported in favor of Harrisburg. On motion, report of committee was adopted.

On motion of Mr. Moon, President Chase was made ex-officio member of Committee on Legislation.

On motion of Mr. Snively, the President was authorized to appoint a committee of five to represent this society at the annual meeting of State Board of Agriculture.

Prof. Heiges, of Committee on Legislation, appointed at last annual meeting, reported as follows:

Believing that a great State like Pennsylvania ought to have a Department of Horticulture and Pomology, I was instructed to draft a bill to that end. It was approved by the Committee on Legislation, was duly printed, passed first reading and was placed on the calendar. Other matters apparently of more importance took precedence, and the bill failed to pass.

Pending the consideration of the bill, I consulted with the Secretary and Deputy Secretary of Agriculture, and both gave me valuable suggestions.

The following letter from Prof. Armsby, of State College, was read by the Secretary.

State College, Centre County, Pa., January 9, 1900.

Mr. E. B. Engle, Secretary State Horticultural Association, Waynesboro, Pennsylvania:

Dear Sir: Please accept my thanks for the program of the Forty-first annual meeting of your association recently received. I regret very much that other engagements will prevent me from being present at that time.

At the recent meeting of the State Grange, I had the honor to present the subject of the "Education of the Farmer." At the close of my address, provisions were made for the appointment of a committee to investigate the condition and needs of agricultural education in Pennsylvania and to report at the next meeting of the State Grange. I am to present the same subject at the meeting of the State Board of Agriculture and it is not improbable that that body will appoint a similar committee. The Pennsylvania Dairy Union has also appointed a like committee upon the subject of dairy education. The Committee of the State Grange was specifically directed to confer with any committees that might be appointed by other agricultural organizations.

It has occurred to me that if anything like organized action is likely to be taken by the several committees in the interest of agricultural education, the State Horticultural Association ought to be represented. Had it been possible, I should have arranged to attend your meeting and should have asked permission to present the matter.

As that is impossible, I take the liberty of writing you in regard to it, and hope you will consider it of sufficient general interest to present at the proper time. It seems to me that the subject is one which should interest every thinking agriculturist or horticulturist, and I believe that there is serious danger that Pennsylvania will fall behind in the march of progress unless she wakes up to the requirements of the situation. I may be mistaken in this, but if there is even a probability of its being correct, the matter certainly deserves notice.

With best wishes for the success of the coming meeting, I am,

Yours very sincerely,

H. P. ARMSBY,

Director.

On motion of Mr. Chase, the Committee on Legislation was authorized to co-operate with other organizations in securing legislation in the interest of the farmer and horticulturist.

"Ornamental Horticulture" was the subject of a paper read by Wm. H. Moon, Morrisville, Pa.

The President appointed the following committees:

To Attend Annual Meeting of State Board of Agriculture: Henry W. Comfort, H. C. Snavely, D. D. Herr, H. A. Chase, Col. J. A. Staple.

Committee of Arrangements: J. Horace McFarland, Jacob Shaffner, D. C. Rupp, Jacob L. Rife, E. B. Engle.

Mr. Thomas Renton read a very practical paper on "The Packing and Shipping of Fruit from a Commission Merchant's Standpoint."

QUESTION BOX.

The following questions were discussed:

1. Has any Grower from South Western Pennsylvania Handled Paying Crops of Japan Plums?

Several persons from Western Pennsylvania had planted Japan plums, but the experience of all was they were not a success.

Mr. Allison: At my home, about 60 miles from here, I have had one crop of Ogon and one crop of Abundance in about 6 years. Buds of Abundance swell in February and are usually injured by spring frosts. I consider the Japan plums worthless in this section.

Mr. Chase: Climatic conditions in Western Pennsylvania seem peculiar. This is the first time I have heard that these plums are not fruitful. In the eastern portion of the State we have but one trouble, and that is that they are too fruitful. We are obliged to pull off from half to two-thirds of the fruit. In New Jersey and in Western New York there are immense orchards from which the fruit is shipped in carloads. They undoubtedly have their weak points, but in many sections they seem to be the only varieties that can be grown at all.

The President: I have Abundance, Burbanks, Satsuma, Wickson, Agate, Red June, and others, and all overbear. I am usually obliged to thin twice, and in some cases three times. While not equal in quality to the European varieties, they are valuable on account of their productiveness and ease of cultivation.

Mr. Barnhart: I have tried all my life to raise plums, but have found none better than a small yellow plum which originated in Westmoreland county.

2. What Are the Best Six Varieties of Apples for Western Pennsylvania?

Mr. Wakefield: I don't believe we have six varieties of apples that have proven satisfactory in Western Pennsylvania. I was reared upon the farm and we grew many different varieties of apples, and I could not conscientiously recommend any for Western Pennsylvania except Baldwin, Grimes Golden and Rome Beauty.

Grimes Golden is one of the best and most valuable. I hear much about York Imperial and have bought three different varieties under that name, and when I went to Liberty street in Pittsburg, I found I did not have it at all. I know that the three varieties named will do well in this section.

Mr. Fergus: Rambo is our best variety. Next is Seek-no-Further, but it must be grown in upland, or it will be no good. For family use I prefer Roman Stem. Rome Beauty is all right. Ben Davis, too, is profitable. Northern Spy will rot while you take it to town.

Baldwin does not do well for me, but succeeds well with my neighbor.

Mr. Miller: Rome Beauty is very satisfactory as a fruit, but the tree is not long lived.

Mr. Barnhart: For my locality the best varieties are Baldwin, Northern Spy, Maiden's Blush and Rambo. Northern Spy does not rot with me. Keeps as well as Rambo.

A Member: I would name Rome Beauty, York Imperial, Grimes Golden, Baldwin, Smith's Cider, and Jonathan.

Mr. Wakefield: I think my friend can get a more profitable variety than Jonathan. If Mr. Miller will apply kainit he will see a great change. Rome Beauty and Grimes Golden, in fact all varieties, must be fed. I will plant Grimes Golden and make more money than from any other variety.

A Member: Baldwin and Grimes Golden are my best varieties. They have made me most money. I am not quite satisfied with York Imperial.

3. Can Hill Culture of Strawberries Be Made Profitable on an Extensive Scale?

Mr. Allison: I consider the matted row more profitable than hill culture.

Mr. Chase referred to the thirty-seventh topic and inquired of Secretary Hamilton what, if any, arrangements have been made for a display of Pennsylvania fruits at the Paris Exposition. He understood that the Horticultural exhibit will be National, not State.

Prof. Hamilton: I do not know what is the purpose of the authorities at Washington. There will doubtless be a display, but, as suggested by Mr. Chase, it will be National.

The thirty-third topic on programme was taken up. "What is the Proper Season to Prune Grape Vines?"

Mr. Snively: Any time after the foliage has dropped and before the sap starts. It must not be done when the wood is frozen. In summer I would prune to two buds beyond the cluster. In case of a severe winter early spring pruning would be preferable.

Adjourned.

Wednesday Afternoon Session, January 17, 1900.

The President called the members to order promptly at 2 o'clock, and reminded them that an early adjournment was desired in order to give the Committee of Arrangements ample time to vacate the hall for an evening meeting of another organization.

Hon. Alva Agee, of Ohio, was introduced, who gave a brief address on "Some Points in Potato Culture."

Mr. Agee was followed by Hon. W. R. Barnhart, of Greensburg, Pa., who read a paper on "Selection of Varieties; How to Plant, Pick, and Store the Apple."

NOMENCLATURE.

Mr. Johnson, Chairman of the Committee on Nomenclature, submitted the following report:

D. C. Rupp, 18 varieties of apples.

H. M. Engle & Son, Paragon chestnuts, Japan chestnuts, 1 variety of apple.

C. U. Good, 5 varieties of apples, 3 plates labelled Gibbs, have all the characteristic of the Limbertroig and the committee believe it to be such.

I. E. Hendenshall, 1 variety of apples for a name, believed to be the old German Such no Weiter (Seek no Further).

Wm. Strachan, 1 variety of apples.

J. Muzzir, 4 varieties of apples.

Wm. Wild, 2 varieties of apples, 4 jars of pears, 2 jars of strawberries.

Mrs. Rossman, 3 varieties of apples.

Rake & Pyke, 10 varieties of apples.

E. L. Snyder, 2 varieties of apples.

W. R. Barnhart, 9 varieties of apples.

John McKenna, 3 varieties of apples.

W. B. K. Johnson, 3 varieties of apples, 1 jar Johnson quince.

Howard A. Chase, 6 varieties of apples, five new and pruning sets.

G. B. Robinson & Co., and Geo. H. Beckert each made a very elaborate display of tropical, semi-tropical and home grown fruit and vegetables; special mention is made of Black Hamburg and Malaga grapes, strawberries, Boston market lettuce, shaddock and asparagus grown by Phillips Bros., and Dickson & Sons, of Neville Island.

J. A. Roehrig, a very handsome display of fruits and vegetables.

H. J. Heinz, of Allegheny City, has fifty-seven specimen samples of condiments, canned goods and table sauces.

Ernest Fisher, special mention of Thedias.

Gustave & J. H. Ludwig, elaborate collection of cut flowers and specimens of American Beauty Rose and Orchid.

Ernest C. Ludwig, show plants and cut flowers.

L. J. Neff, Chinese primulus.

Randolph McClemence, grand stage decoration; also exhibits of fine store plants, such as Crotons and fine Dracemas.

John Boder, exhibit of fine Knited Palms.

Blaha & Fass, two groups of fine decorative plants.

Thomas Ulam, décoration of smilax, holly and laurel.

Wm. Loew, an artistic bouquet, made of vegetables; also decoration made of dried palms.

Michael J. Fish, of Philadelphia, representing R. Portner, of W. M. Woodruff & Co., fine display of cut roses.

Pittsburg Floral Co., decoration of wild smilax.

Lawson Carnation sent by Galvin, florist, of Boston, arrived in bad condition.

W. B. K. JOHNSON,
THOS. RAKESTRAW,
M. C. DUNLEVY,
LINCOLN I. NEFF,
Committee.

RESOLUTIONS

Mr. Barnhart, Chairman of the Committee on Final Resolutions, submitted the following:

Whereas, In the arrangements made for the comfort and convenience of the State Horticultural Association at the Annual Meeting just closing, which are far beyond the expectations of our members; therefore, be it

Resolved, That the thanks of this Association be and are hereby tendered to the Allegheny County Fruit Growers and Gardeners' Association, and the Florists' Association of Pittsburg for their untiring labors and efforts for a successful and interesting meeting; for the elaborate method and taste displayed in the arrangement of the fruit, floral and vegetable exhibits, and for the courtesy and kindness evinced in every effort made for this most successful meeting.

Resolved, That our most hearty thanks are due Christ M. E. Church Choir for the part taken in our evening entertainment.

Resolved, That our thanks are due to the Press of the city for their most satisfactory reports of our proceedings.

Resolved, That our thanks are due to the mayor and the citizens of Pittsburg for their presence and kind words of encouragement.

W. R. BARNHART,
J. W. MILLER.

Mr. Chase: I can not let these resolutions pass without adding a word in behalf of our western members. I have attended the meetings of this society for nearly a quarter of a century, but I must say that we have never received the royal welcome and widespread local interest that has been shown here, and I would add only one word of caution; don't invite us again, unless you wish us to come.

Prof. Heiges: I also feel like adding a word. I have attended

these meetings for almost 40 years, and I most heartily endorse all that has been so well said by Mr. Chase. Nowhere have we had such a hearty welcome; nowhere such a display of fruits and flowers. With this meeting I sever my connection with this association as its presiding officer, but I shall always recur with feelings of pleasure to the interesting and profitable meeting we held here.

Mr. Moon: After having heard from the veterans, probably a word from one of the boys will be in order. I have attended a few meetings and was presiding officer of this Association for five years, and I always had an idea that Pittsburg was a great city for smoke and hustle, and that all the good things in Horticulture were centered east of the Susquehanna and on the banks of the Delaware. I am ready, now, to acknowledge my error and to say that I will go back east from one of the finest and best meetings I ever attended, and if life is spared us and we are again honored with an invitation, we will surely accept.

On motion, the resolutions as read were unanimously adopted.

The following preamble and resolutions were read and adopted by a rising vote:

Whereas, It hath pleased our Heavenly Father to remove from earth and from the membership of this association, Wesley Fulmer, of Castle Shannon, Allegheny county, Pa.; therefore,

Resolved, That while we bow in submission to His Divine will, yet in his death we, the members of the State Horticultural Association of Pennsylvania, feel that we have lost an esteemed friend and faithful co-worker.

Resolved, That we extend to his bereaved wife and family our sincere sympathy in this their sad bereavement.

Resolved, That a copy of these resolutions be forwarded by the Secretary to Mrs. Fulmer, and they be spread upon the minutes of this society.

J. S. BURNS,
J. E. HANDENSHIELD,
H. R. LONG,

Committee.

Prof. Heiges: I believe that I knew Mr. Fulmer more intimately than any of our eastern members. I met him frequently at Farmers' Institutes, and found him a man of noble character. He was an experienced nurseryman, abreast of the times, familiar with the newer varieties of fruits. It was through his individual efforts that we met here, and I personally requested my friends to vote in favor of Pittsburg.

PRESIDENT S. B. HEIGES ELECTED AN HONORARY MEMBER.

Mr. Snavelly: We have just heard words spoken kindly and tenderly of the dead. We have with us a gentleman who has been engaged in the horticultural work for 40 years. He has been for many years a member of this Society, and during the past four years its presiding officer. He has been Pomologist of the Department of Agriculture at Washington, and I feel that it is due this Association that upon his retirement from the presidency, it honor him by his election to honorary membership. I move that he be elected an honorary member of this association.

The motion was put by President-elect Chase and unanimously adopted.

Prof. Heiges: I would do violence to my feelings did I fail to express my appreciation of the honor you have conferred. I have given this association the benefit of my experience in past years, and now to have my name associated with those of Barry, Downing, Meehan and others, is more than I deserve. I thank you most heartily.

Adjourned.

PAPERS SELECTED FROM THOSE READ

AT THE

General Round-Up of Institute Managers,

HELD AT

LOCK HAVEN, PA., JUNE, 1900.



PAPERS SELECTED FROM THOSE READ AT THE GENERAL ROUND-UP OF
INSTITUTE MANAGERS, HELD AT LOCK HAVEN, PA., JUNE, 1900.

IDEAL STANDARDS IN FARMING.

By GEORGE E. HULL, *Mercer county, Pa.*

A successful and wealthy manufacturer of railroad iron, when asked the secret of his success, answered, that his success lay in his persistent endeavor to make each succeeding batch of iron better, if possible, than the last one made; and that all should approach as near as possible to an ideal standard, or model of merit, as a manufacturer could produce.

The celebrated Madole hammer, and Henry Disston saws, which every carpenter recognizes as the very best tools of their kind, the mowers, the reapers and binders, which have successively come to the front and to the aid of the farmer, and every other article that is to-day manufactured which has a recognized merit and standard value, won its reputation through the determination of the manufacturer to produce and put upon the market a first class article. This principle of honorable success, so applicable to the manufacturer, who successfully manufactures his goods after an ideal standard, is no less applicable to the breeder, the stockman or the general farmer. The farmer, like the manufacturer, who is ambitious to be successful in his calling, should ever be guided by an ideal standard or model of merit, which should lead him onward and upward, not only morally and socially, but also as to his farm, its management, its equipments and conveniences, as well as the selection, breeding and marketing of his stock. In full sympathy with this spirit of progress, and always profiting by his own experience, and also by the experience of, and information given by others in social intercourse and through the press, with that foresight and discerning judgment which becomes the progressive farmer, he should endeavor to make every step taken one of progress; and this must necessarily be to insure future prosperity to the farmer in this country.

The brood mare, the brood sow, the bunch of breeding ewes, every bunch of sheep selected and fed for the shambles, every bunch of

lambs bred, should be the most even in size, the finest and best in quality, and in every way the most desirable and salable of any stock preceding them. Finally, the standard of their excellence should be their own advertisement and their market. The credit or debtor balance at the year's end on the pages of the ledger devoted to the farm stock, depends not only on the management and the feeding of the stock, but also, on its yearly weeding and selection. And upon the quality of the standard chosen as a model or guide in the management, settles the problem as to profit or loss in labor and investment.

It is a maxim "that the sheep possesses for the farmer a golden hoof," and while this should be true, comparatively speaking, the saying is just as likely to be erroneous, as the remark we have often heard made that "sheep were profitable as grubbers." "Do men gather grapes of thorns, or figs of thistles?" There can be but one answer to this question, and that in the negative, and I do not know of a single instance in my recollection where any man gathered successfully, wool and mutton from hazel, burdock or thistles. We often see the plan tried, but the scheme is never successful.

The start in a race frequently determines the result. The preparation of a seed bed often determines the result of a crop; hence, also, in the beginning or start in a farm enterprise, upon the standard chosen by which we select or breed our farm stock, with clear and well-defined ideas as to what purposes we select for, or breed for, determines whether or not the enterprise is to be crowned with success, and the hoofs of our farm stock prove to be golden.

The farmer whose ambition is guided by cool and judicious judgment in the management of a mixed husbandry, is probably as likely to succeed at present under the influence of prevailing circumstances to send his grain fed to stock and the stock itself from the farm on golden hoofs as any other class of farmers; like other rules, however, this principle is subject to exceptions. And yet we confound this principle of a mixed husbandry with a principle which often breeds disaster, as in carrying some of all kinds of stock we are likely to overcrowd our feeding capacity in winter, and our pastures in summer. The sales are not sweeping at any one time, lessening the amount of stock at a single sale to the capacity of the amount of feed on hand to carry the stock through a protracted drouth or long winter. Every careful and foresighted farmer who foresees the unwelcome expense of having to buy feed in seasons of scarcity, to carry his stock through a protracted drouth or long winter, will avert the danger by adjusting the amount of his stock to the corresponding capacity of his feed.

It is an old adage and a true one, that "a danger foreseen is half averted." And the farmer who realizes this standard fact that

we are at all times subject to late spring frosts, drouths in summer, long winters and frequent shortages in some of our various kinds of feed crops, and at all times is prepared for the emergency by a resource supply of feed, is not the man who is ambitious to sell his farm in this community of home markets and go west. As we think over the list of names of farmers of our acquaintance in almost any neighborhood, we observe this fact; that, with possibly the dairyman excepted, who has all the necessary help within his own family, the farmers have been the most prosperous and progressive who have carried out a plan of mixed farming or mixed husbandry. Farmers who have not gone wholly into sheep raising every time sheep were high in price, or principally into horses when they were the most wanted, or into something else at the time of its boom; but, on the contrary, have gone on in the even tenor of their way, keeping some of most all kinds of stock, whose ideal standard is ever a good and marketable quality, instead of quantity, and whose ideal life as a farmer is independence and contentment, for contentment, if under comfortable circumstances in the middle walks of life, is independence. And it is an old proverb always truthfully told, that the greatest wealth that a man can possess is contentment.

There never was a successful manufacturer of any kind of a commodity, or any man who had under his care and control a complication of affairs, who had foresight and discernment enough to direct, govern, and successfully manage his own business, but what was necessarily an independent thinker. This is equally true concerning the farmer. A man may follow some antiquated system of management, as he has always done, and also his ancestors before him, or he may sell goods for such a percentage of gain, and mechanically complete the circle of an annual business by rule. But the man who stands master of the situation in his business in any calling in life, must realize that we have entered an age of improvement, and under the almost startling changes from the old modes to the new ways, which are to-day successfully engaging our attention, he must think and act for himself or get left in the race. And any move that he may make in any way in the management of his affairs, should be made so far as possible with a knowledge of what others are doing in the same line of business as his own, but with a considerate independence of the course they are pursuing in that line of business. If the majority of merchants throughout the country that are engaged in the dry goods trade, should change, and go into the hardware, or into some other specialty, because the merchants in that line of trade had done the best during the past year, that business then would be overdone and many of them would see hard times and even fail.

Should the majority of the men in the professional callings throughout the country adopt one profession, there would not be room enough in Webster's proverbial "up-stairs" and the majority would fail, while those who remained true and unwavering in their special branches previously chosen would do well.

And yet we, as farmers in this country, too frequently make just this kind of a mistake. Too many of us do not do enough independent thinking and acting. Like drowning seamen, we are too apt to grasp some project of bright promises that unexpectedly looms up, and swamp it to the inconvenience and peril of the majority. The man who is continually changing the standard of his farm operations, shifting from one specialty to another, in constant pursuit of that line of farming which is paying the best at the time of the change, usually hoes a hard row. Said a man to me a few years ago, "I do not know why it is so, but it is just this way with me; when I get anything to put onto my farm, let it be stock, or seed, I have to pay exorbitant prices for it, and when I get any farm stock or produce ready to sell it seems to me that all creation has the same article on sale. The price is then always low, and I do not get much for it. If I could sell my farm, I believe that I would engage in some other business." The simple story of this man's experience, so honestly and discouragingly told me is not an uncommon one, and is easily explained. He was always ready for the commencement of a new race, for which he paid large entrance fees, and in which he was always just as sure to get left. Always paying inflated prices for the article most in demand at the time of its purchase.

To illustrate: When butter was bringing a good price, this man was always looking around for another cow or two. Because, as he said, butter paid now better than anything else on a farm. When the usual periodical high prices in sheep came around, he found himself out of that kind of stock, since he had sold the last ones he had at a sacrifice to get rid of them; but as he always went into the business of sheep raising just under these circumstances, he never failed to buy. But when he again got his stock bred, grown and ready for the market, he found that thousands of other farmers had done precisely the same thing. The market was now glutted with the article he had now on sale and our friend would again be obliged to sell his surplus stock at a sacrifice to relieve his pasture or to get through the winter. When potatoes were scarce and high in price, he bought seed and planted more than his usual acreage to potatoes, and was usually disappointed at the price he was obliged to accept for his crop, after digging, storing, and hauling to market. He would sell his team in seed time or in harvest, lose valuable time in looking for another and finally pay as much more money for an-

other team than he sold for. Thus vascillating and ever changing, his progress was always slow, always cramped and discouraging. His row was a hard one. This man and his family were known in the neighborhood where they lived to be hard workers. From morning until night the year around this man and his family were seemingly busy at something. His crops were unusually good, as they were well cared for. But the financial part of his management always seemed to be a succession of failures. By way of comparison, let us make use of a brighter illustration, as a proof that farming as an enterprise need not necessarily prove to be unremunerative and disastrous, as to both pleasure and profit on an eastern farm. A neighbor of this farmer on a farm no larger or better, with family expenses no less, with no better start in life, and yet a farmer who has always seemed to hold time by the forelock, never being driven to a financial move, but successful, as a practical business farmer, whose products usually brought remunerative prices, and whose farm stock seemed to all go off on golden hoofs. The key to this man's success lay simply in this fact; he adhered strictly to a principle of a mixed husbandry. And his farm productions were all model standards of merit.

Never being enticed to deviate from, or change his well chosen standards as to kinds, quality or capacity, no matter how strongly the attention of other farmers might be turned towards something else which seemed to be paying the best at the time. He could always be found in possession of one or two good brood mares, a brood sow, a few good stock and butter cows and a few well selected breeding ewes.

Every year he turned off one or two good horses of his own raising, at prices which made his neighbors nervous to hear about. He usually sold his calves thrifty and shapely in the fall, and was always a matter of encouragement to despairing ones to hear this man tell what he had made from his cows that year; his stock of ewes were always of the best of the larger grade, irrespective of any fine breed, (except in the case of the sire), which he continually weeded from year to year, throwing out the weak, old or defective ones, and drawing his recruits from the best ewe lambs, which he rarely sold. He invariably had a few premium buck lambs, which brought good prices among his neighbor farmers for stock, and raised the average of all the lambs sold, which, added to the amount of money the wool sold for from the ewes, netted him an income from his flock, the exact amount of which never indicated hard times. Having to buy nothing on the top of an inflated market, but often being enabled to sell some of his various kinds of stock on such a market, and it always seemed that he had some kind of stock or farm products that everybody wanted, and by keep-

ing within the capacity of his farm, and not being subject to disappointing failures in scarcely anything, he was, in the majority of cases, enabled to feed his hay, forage and grain to his farm stock at a profit, and finally turn everything off on golden hoofs. Two examples which we commonly see portrayed in the different phases of farm management and farm life.

Finally, farmers, upon the standard which measures our aspirations in the different branches of farming largely depends our success or failure in the special branches chosen, and to which we must now be fully awake, and upon the standard chosen as a model for our guidance, depends the success or failure and worldly rating for all men in any occupation in life. Let us then, as a means of information, and making our farm life lighter, our rewards greater, and our lives brighter, take advantage of every opportunity that presents itself to raise the standard of our ideas, as to our homes, our farms, our conveniences and privileges, the quality of our selections and products, and through the influence of standard books and periodicals, which should adorn our tables, and through social intercourse with one another, as on occasions like the present, circulate an exchange of opinions that will tend to lengthen, deepen and broaden everything connected with farm life. Born of those privileges which are said to make it honorable, independent and desirable.

NATURE STUDY IN THE PUBLIC SCHOOLS.

By J. H. PEACHY, *Belville, Pa.*

From the remotest rural district, as well as from the crowded city, comes the oft repeated call for better educational advantages. That cry has never ceased since the adoption of the free school system. May it be prolonged until every country boy shall have opportunities equal to those of his city cousin. It is a lamentable fact that the country boy labors at a disadvantage. Many excuses are made, but no good reasons are offered for this unwarrantable condition. Not alone is his time in school limited to the minimum, but the course of study leaves untouched, that which confronts him in the pursuit of a business—the most important of all the industries known to the category of man's usefulness. If agriculture

is the basis of all other industries, then all honorable means should be employed for its advancement. Nothing should be done to cripple its interests. Nothing should be left undone that would encourage its promotion, or result in securing more satisfactory results for those who labor to feed the world.

To this end and for this purpose we turn to the public schools, the university of the common people, as the surest means of securing higher attainments in agriculture. If knowing precedes doing, then training must necessarily be the rule of action. In the performance of any duty, assigned or undertaken, there must be some preparation in order to accomplish the purpose. If this be true, and if the former's business does not differ materially from any other, then a knowledge of the fundamental principles governing his interests will evidently guarantee better results, and a little more prosperity just now would not be very embarrassing.

But we do not wish to heap any more burdens upon the children of the public schools. The curriculum is already heavily loaded. To further increase the labor of teacher and pupil without a corresponding decrease is questionable. But by striking out and inserting, studies bearing upon the future usefulness of the toiling millions might be introduced without endangering the interests of the schools. We advocate no radical changes; rather a gradual introduction of elementary science. We favor this, because it would have a good effect upon the interests we represent, by bringing the child in closer relation to the things in nature which shall require his attention in after life.

What would you think of a commercial school that did not teach the principles of penmanship? What is your opinion of a school of medicine without instruction in chemistry? What is your idea of a normal school that does not have a training class? What must you think of a public school in the rural district, with a farmer for school director, and the financial support coming from farmers, taught by a farmer's son or daughter, who was educated at a college whose professors chose farmers for parents, and farmer's daughters for wives, walking in wisdom's ways from first to finish, and nothing taught in that school, attended principally by prospective agriculturists, that touches the great underlying principles of their future business. Great nature, with all her abundant wealth of resource and beauty, utterly disregarded in the instruction given.

Is the picture overdrawn? Do you know of such a school? If so, are you in any manner responsible for such a condition? Is it any wonder that you complain of the bright boys leaving the farm? I am surprised that the so-called dull ones remain at home. They are educated away from it. Genius goes, where the money flows. 'Tis natural that it should. The business centres need the bright boys,

yea, must have them to advance the commercial interests of the world. We dare not charge their going to our system of education. We have no quarrel with that. The subject matter, however, does not meet the requirements. In other words, country schools do not prepare country children for country life.

Education is the preparation for complete living. The better the preparation, the more complete the living. The more directly our education pertains to our life work, the better will be its application; the closer will be the relation; the stronger will be the attachment; the brighter will be the prospects of a successful termination.

Believing that the introduction of nature studies into the public schools would be a wise means of training for future usefulness, especially for farmers' sons and daughters, we cheerfully recommend such instruction. The farmer's business brings him in daily contact with nature. He should be on familiar terms with his surroundings. His is the most natural occupation, approaching nearer to the purpose of the Creator than any other calling. His dependence upon nature's resources should intensify his interest in her laws, creating an increasing desire for a better understanding of the silent forces that control his business.

To this end should the education of farmers be directed. To secure such results we must look to the public schools. But few prospective farmers will receive the training given in an agricultural college. The public schools must begin their work during the formative period of life, when the mind of the child is in the most impressionable state. Children have inquiring minds. They are ever anxious to see, and when their curiosity is aroused, can ask difficult questions. How the eyes sparkle; how the lips move; how the countenance lights up; and how the young heart beats at the thought of a new discovery. What joy unspeakable to the mind of a thoughtful child just entering the great domain of nature. What means for the development of thought, easily accessible to the home and the school rooms, unnoticed and unemployed by parent or teacher. And yet men grow eloquent in praise of the great work being done along educational lines. Great good has been accomplished, but those doing the work have been poorly compensated.

But how much more might be accomplished for the great cause of education, if simple lessons from nature's book would be taught in the schools. It would be like seed sown on good ground, and would bring forth fruit an hundredfold. Such instruction would be likened unto that of the Great Teacher, who went about doing good. His illustrations were taken from nature. Plain, practical, comprehensive teaching, being natural in application, clear in thought, beautiful in construction. A student of nature must necessarily be a close observer. He must be qualified to compare, contrast, ar-

range, classify. These accomplishments are the result of study and culture. Some are especially gifted in this direction, even in youth displaying certain qualities of mind and heart, while others less fortunate in the beginning, must have the dormant faculties of the mind aroused by outside influences. This is partially the business of the schools.

The pupil must not only be taught to think, but be given something to think about. What better subject matter can be chosen to interest and instruct children than the things in nature, so bountifully and so beautifully arranged for our consideration. The tangibility of the little things within easy reach, afford splendid opportunities for the cultivation of the observation. Teachers frequently complain that their pupils are slow to comprehend what they read. That they have difficulty in understanding the meaning of problems in arithmetic, and slow to understand the explanation. In part this may be attributed to inattention. Is this a natural condition of the mind of the child? Or, is it the fault of wrong principles of teaching. We hope they are not classed with those that "Eyes they have and they see not; ears they have and they hear not." Better say their observation has not been trained. They have not been taught to see. Had their curiosity been aroused by lessons in nature studies, or by examining the little things that pass by unnoticed, their ability to grasp and hold ideas in the mind would have been strengthened by application, thereby proving that knowledge is power. This practical knowledge would also prove beneficial in the various pursuits, when preparation becomes the great factor in the problem of human life. Two values may be given for the result. The satisfaction of knowing a thing, and the ability to do it.

The changed conditions of the farmer demands a better education. This demand is better satisfied than in years gone by. But the great majority of farmers have not fully realized the importance of more scientific knowledge. They count money spent in education as practically wasted, unless they have an exceptionally bright boy, whom nature has intended for one of the three professions. They do not consider that the farmer's business requires the hardest kind of thinking. Seemingly satisfied with that antiquated expression, "only a farmer," they do not appreciate the true worth to be gained by a better knowledge of the relationship that exists between the farmer and his natural surroundings. Until this is taught and taught correctly, we shall continue to hear the old, old story, grumbled over, and over, and over again of "farmin' don't pay."

The only remedy that appeals to the understanding is better education for the boys and girls. Teach them how God in His infinite

wisdom has prepared the earth for the habitation of man. How these natural resources, when properly applied, will supply our physical needs. Give them the testimony of the rocks, teaching them that the little pebble means much more than an obstruction to the unprotected toe. Something of the formation and composition of soils, and how they are affected by climatic influences. Give instruction upon insect life, their characteristics, their destructive and beneficial tendencies. Teach them of plant life and plant growth; the dangers arising from the devastation of forests; how the beautiful birds are our friends; the life of a grain of corn; the history of a pumpkin seed. Teach these and numberless other interesting things in nature, that affect the destiny of the human family.

Teach them also that there is a beauty value in education that cannot be over-estimated. The love of the beautiful is a fit companion to the love of the good; a sure foundation for a pure life. Kind nature displays her varied beauty in innumerable forms. On every side are evidences of the beautiful, fitted to create in the mind of the child higher ideals and more noble aspirations. We need not wander far from home to be benefited by these elevating influences. The little flower by the wayside; the stately pine on the mountain top; the waving fields of golden grain; the green slope overlooking the valley, the silvery stream winding through the rich meadows, are full of beautiful thoughts for the teacher. The golden sunset fading into the gathering night, the flickering clouds, the ever-changing sky, the sun in his matchless glory, are interesting subjects for the children. The poet whose heart was full of the love of the beautiful could view the rainbow and cry out—

“Triumphant arch, thou span’st the skies
When clouds begin to part.
I ask not proud philosophy,
To teach me what thou art.”

Let the country schools prepare country children for country life, by teaching the subject matter that touches their future business, and the farmer will become what he ought to be—the biggest man in all the country.

BOTANY ON THE FARM.

By PROF. GEORGE C. BUTZ, *State College, Pa.*

The study of any science makes men more thoughtful upon the facts and principles of that science. Farming operations are placed upon a scientific plane when we regard their relations to the principles of the sciences appertaining to them.

The study of agricultural chemistry directs our thoughts not to the grain or hay we feed our animals, but to the muscle and milk-forming elements contained in them; not to the manure of the barnyard, but to the plant food in it. The study of soil physics likewise turns our minds from the plow and the harrow to the aeration and nitrification of soils and the conservation of moisture. The study of botany regards not the fodder, the stubble, nor the ears on the corn plant so much as the form of life in it subject to the influences of light, heat and moisture, all of which may be modified by our methods of culture. The time was, not long since, when botany was a science wholly apart from the practices of agriculture. The height of the botanist's ambition was to know every plant in existence, give it a name and a place in his "General Plantarum," and when thoroughly dry and dead, place it in the catacombs of his herbarium. He loved his plants *more*, being dead, than alive. *Now*, however, the science of botany is one of the most helpful studies that the thoughtful farmer can pursue.

The living plant, not the dead plant, is the subject of consideration, its organs of nutrition, its adaptability to cultivation, its struggle for existence, its capabilities under judicious treatment, its power to resist its natural foes, the possibility of its permanent improvement, and so on.

In studying the *structure* of plants, we learn that however much they differ from each other in size or habit of growth, every part present may be referred to one of the three essential parts of a plant, namely, the root, stem or leaf. The stem being the axis of the plant, it furnishes a channel for communication between the leaves in the air and the roots in the soil. The stem may be so modified that it resembles a leaf, as in the flat-stemmed seaside grape (*Muehlenbergia platyclada*), or it may form underground, imitating a root, as in the potato. Nevertheless, it is still a stem,

performing the functions of a stem. Thus it is that the potato tuber has "eyes" or buds which are commonly borne upon stems and may be used to make cuttings for propagation, just as the stem of a grape vine or current bush may be used. As branches proceed from buds on the stem, and likewise the large triple thorns upon the honey locust proceed from buds on the stem, therefore the thorns are merely transformed or deformed branches or lateral stems. So, too, the tendril upon pea vines are demonstrated to be modified leaves, the scales on winter buds to be deformed leaves and the gorgeous and wonderful parts of flowers from the calyx to the pistil are only leaves greatly changed to perform a special function. Facts like these, discovered only with close study and profound reflection, help us to a clearer understanding of the principles underlying our operations of pruning and training fruit trees and vines. How is it that a branch of a pear tree that is a shy bearer, if bowed to the ground will, in the second year, bear fruit, while the upright branches continue fruitless, or that the scion of a seedling apple grafted on a mature tree will produce fruit buds in the second year; or why does a dwarf pear bear at an earlier age than a standard; or why will the young fruit tree injured by borers bear earlier than the unharmed tree? The explanation is simple enough when we know that the flower bud is only a transformed leaf bud brought about by the slower movement of sap through the bent over pear shoot, or the wound between the scion and stock of the apple graft, or the less congenial quince stock of the dwarf pear, or the check upon the growth due to the injury of insects in the trunk of the young tree.

The roots of plants as considered in modern botany perform a most remarkable work in the economy of plant life, and a clear knowledge of their character and function, the length and depth to which they extend themselves, has brought about many innovations in our methods of cultivation. The great bulk of the material assimilated to form the tissue of the plant, its leaves and fruit, must enter the roots and by them be forced to the extremities of the branches. In the case of an apple tree bearing 40 bushels, or a ton of fruit, not only that ton, but several tons of material are gathered by the thousands of little rootlets at the extremities of the root system. Where, then, is the force by which such weights of material are raised to the tops of trees? It is possessed by the roots acting like a force pump with as many little valves as there are cells in their construction. The root pressure is exceedingly great and has been carefully measured in a large variety of plants. We have seen evidences of it in the excessive flow of sap from late pruned grape vines (the bleeding). A strong vine will in the first day after it is cut exude a quart

of sap. If the soil is very damp and transpiration from the plant is slight, owing to a humid atmosphere, the root pressure is so great that drops of water will be forced out at the points in the margin of leaves. I have frequently observed this, particularly upon plants in the greenhouse.

The actual measurements of root pressure place more clearly before us the magnitude of the force. As early as 1720, the Reverend Stephen Hale attached mercurial manometers to stumps of the European grape and obtained a maximum pressure of 43 feet of water. In 1874 W. S. Clark, of the Massachusetts Agricultural College, made many tests, in which he obtained for the Black Birch a pressure of 84.77 feet of water, and for a strong vine of our native summer grape (*Vitis aestivalis*) a pressure sufficient to sustain a column of water 88.74 feet in height. In a unique experiment performed upon a mammoth squash by this same observer, the root pressure of growth was measured in terms of pounds. The young fruit was harnessed in two hemispheres of strap iron firmly riveted together and a strong lever carrying weights was adjusted over the cage to keep the hemispheres together as the squash was increasing in size. As the tissue gained strength the weight was increased until the total weight raised by the growing squash was 5,000 pounds or two and a half tons. Facts like these picture to us the wonderful nature of the plants about us and turn us to thinking how we may take advantage of this or that force, how we may aid a plant to develop symmetrically and yield more abundantly the crop we desire.

Turning our attention for a moment to the third part of the plant structure, the *leaves*, we learn by a microscopical study of their structure that they are formed to do a vast and important work in the economy of plant life. Transpiration is taking place from the surface of the leaves; the water, which was the carrier from the roots to the leaves of the plant foods taken up in the soil, is being evaporated from the combined area of the leaves. This area in the average apple tree is an acre in extent and several tons of water are evaporated by it in a single growing season. The leaves are termed the "lungs of plants," performing that function for plants corresponding to the breathing of animals, and to aid in this, the leaves are possessed of thousands of breathing pores through which gases pass into and out from the leaves. These breathing pores are found upon all green parts of plants, and in some cases are so numerous that 180,000 of them have been calculated to the square inch. The unnatural loss of foliage is to a plant as hurtful as the loss of lungs would be to the animal. Hence, we can understand why a peach tree defoliated by the disease called Leaf-curl will drop all its

peaches, or the currant bush stripped of its leaves by the currant worm fails to perfect its fruit. The plant foods gathered by the roots and forced to the extremities of plants are not in condition to be used in the development of fruit or any other tissue until it has been assimilated by the leaves; that is, the converting of inorganic material into organic material. The active agent in the leaf in the matter of assimilation is the chlorophyl, that which gives the green color to leaves, and is so very dependent upon light for its existence. We know so well the fate of potatoes sprouting in a dark cellar, or seeds sprouted away from light. We know, too, the superior quality of the peach or apple developed in the full sunlight on the south side of the tree as compared with the insipid fruits from the dense and shaded portions of the tree. We have seen, too, the endeavor of plants to absorb the greatest possible amount of light in the phenomenon known as heliotropism, when every leaf is turned to the sun as it progresses from the east to the west in its daily course.

Studies like these help us to understand the philosophy of the practical problems of thinning seedlings where they crowd in the row, of pruning thick-headed trees, of removing vigorous weeds, etc., etc.

Then, when we pass to the study of those special organs of plants which are clustered in the flower and known as the reproductive organs, we seem to be taken into the very confidence of plants and are permitted to learn more of the secrets that are withheld from the thoughtless and unobserving. We learn of the self-sterility of some flowers, the prepotency of certain pollen, and the advantages of cross-fertilization. We can then appreciate the philosophy of mixing varieties of fruits in the orchard and strawberry bed, and of separating widely the sweet from yellow corn and the melons from cucumbers.

It seems to me that such a study of botany as I have briefly indicated will furnish a training for the mind of the farmer and orchardist that is not unlike the training afforded the doctor in the study of physiology. I believe, too, that the former is as helpful to the farmer in prescribing for unhealthy plants as the latter is to the doctor in his practice of medicine.

How can we intelligently treat a plum tree diseased with the Black-knot unless we know the true nature of the disease. I often refer in this connection to the farmer who regarded this disease of the plum as being like the "hide-bound" condition of a horse and undertook to relieve a young plum tree by splitting the bark of the trunk from the fork to the ground on three of four sides. When a year later I asked him if his treatment destroyed the Black-knot, he replied, "Yes, but it also destroyed the tree." I believe there is no better way to get a farmer to properly care for his knotted plum

and cherry trees than to have him acquire a knowledge of the fungus—the microscopical parasitic plant, that is preying upon his trees, repeatedly throwing off thousands of invisible spores by which the disease spreads and becomes so prevalent, destructive and unsightly. But this is only one of many plant diseases which, when we understand their nature, we may intelligently treat and overcome. The modern botany I am recommending for the farm considers these parasitic fungi and leads our thought into a knowledge of the myriad forms of cryptogamous plants which are to-day such a potent factor in determining the success or failure of almost any agricultural or horticultural crop.

Even a very limited study of botany will dispel from our minds those legends and false notions about plants that should be buried with the nineteenth century. The United States, so far in advance of other nations in many respects, the cynosure of all foreign eyes, could have removed from her agricultural communities those black stains of foreign superstition about plant life, if we would all study botany. How often we hear echoes of the ancient notion expressed in the following rhyme:

“Sow peas and beans in the wane of the moon;
Who soweth them sooner, he soweth too soon;
That they with the planet may rest and rise,
And flourish with bearing, most plentiful wise.”

How frequently, too, we meet farmers who insist that chess or cheat in their wheat fields sprang from good wheat seed. Such absurdity is not very unlike the common association of plants in witchcraft so prevalent in the rural districts of European countries.

TRAINING FOR OUR LIFE WORK.

By ENOS H. HESS, *State College, Pa.*

Before we discuss the proper training for a life-work, we should first determine what our life-work is to be. There are but few questions which confront a young man that are of more importance than this one. Nature has given us the power by which we can become successful in some certain line; then let us follow out na-

ture's plan. In the words of Sydney Smith, "Be what nature intended you for and you will succeed; be anything else, and you will be ten thousand times worse than nothing." Ralph Waldo Emerson says, "The crowning fortune of a man is to be born with a bias to some pursuit which finds us in employment and happiness."

It matters not what the occupation is, save that it be an honorable one. "The notion that the three black graces, Law, Physic, and Divinity must be worshipped by a candidate for respectability and honor has done incalculable damage to society. Better be the Napoleon of bootblacks or the Alexander of chimney sweeps than a friendless and shallow-pated attorney who, like necessity, knows no law, watching vainly for victims in an unswept chamber where cobwebs in dusty magnificence hang, with no companions but the gaunt spider, a few dog-eared, bilious-looking volumes, and a stale, political newspaper."—Matthews.

We may change our occupation for one that we deem more congenial, but like

"Tompkins, who forsakes his last and awl
For literary squabbles,
Styles himself poet, but his trade
Remains the same—he cobbles."

So, we, if born farmers, will remain farmers until doomsday. "It is not the calling or station in life," says Matthew, "that gives dignity or nobility to the man, but the man that dignifies the calling." Exemplary men in the contemplated profession should be consulted, who can give us information which were we to obtain through our own efforts, would cost us a large amount of money and time.

We are often hindered from making a proper choice by those who love us most dearly. It is the duty of parents and friends to aid us in making a proper choice. In no case, however, should their desires be changed to mandates, as no one can succeed in a profession for which he does not have a natural taste. Michael Angelo, the great artist, neglected school to copy drawings which he dared not bring home. What a great loss to the world it would have been had he not had the courage to follow out nature's suggestion.

When once the choice is made, there should be no delay in the necessary preparation for the chosen work. "The greatest weakness of our young men is fickleness, and where one of them perseveres in a calling which he ought to abandon, a dozen abandon their callings who ought to stick to them." Some young men, especially of the wealthier class, think that the choosing of a profession which compels them to be on duty in all seasons of the year compels them to

forego many pleasures, but is it not true that "the miseries of idleness are tenfold keener and more numerous than the most laborious profession."

The one and all absorbing purpose in the training of the athlete is, that he may develop his strength and power of endurance to enable him to come out ahead when the trial comes. Is there not a similar purpose in the training for our life-work? The athlete develops those muscles which are most needed in his special line of work. Should we not follow out his example? But how can we, if we lack a purpose in life? The world's activities are too wide for us to try to master them all. In the words of Pope, "One science only will one genius fit; so wide is art, so narrow human wit." We should not be simply good, but be good for something, and say, as Paul of old, "This one thing I do."

In these days of close competition, we must concentrate our energies upon one thing if we wish to succeed. With proper concentration, we will be like steam in the cylinder of an engine, with force to perform boundless work; without concentration, we will be like the steam sent out loose into the atmosphere which changes into mist and soon becomes invisible. William Pitt went straight from College to the House of Commons and in two years became Prime Minister of England, reigned for nearly a quarter of a century virtual king, and carried his measures in spite of the opposition of some of the greatest men England ever produced. The simple secret of his success was that his whole soul was swallowed up in the one passion for political power. If we stick to our business, our business will stick to us. A jack-of-all-trades has long since been stamped as a master of none. There are a few exceptions, such as Cicero, Bacon, Dante, Scipio Africanus, and Leonardo de Vinci, but they only serve to prove the rule.

On the other hand, we become too narrow to be perfect in even the one thing we have taken up. In many professions there are subjects which at first thought appear irrelevant to the main work in hand, but are yet of the utmost importance. A dairyman, for instance, may have for his chief aim the manufacture of butter; but what good will the butter do him if he does not have business talent enough to sell it for the highest possible price? Some men are continually improving their minds at the expense of their bodies, while others are using only their physical strength and think that their minds, like wine, will improve with age when not used. Is it not true already that in order to find a perfect man we must take a brain from one, a heart from another, senses from a third, and a stomach from a fourth. Many neglect the moral side of their natures, but we should be men first, and then follow out the hints nature has given us as to adaptability along a certain line.

Another sterling quality which young men should cultivate, is originality. The men who are making the greatest success of their work are the ones who think for themselves; they are the men who are ever getting better methods of doing things and taking the short cuts. If we copy from others in everything, we cannot expect to prosper. "The echo is never as loud as the original, neither is the copyist as strong as the one from whom he copies." If we see some one else doing things in an improved way, we should make use of the other's knowledge and experience, but let it be re-cast so that, although it was borrowed, let it become our own. The Greeks were noted for their power of learning from others, and yet they transformed this knowledge in such a manner that when coming forth from them it was distinctly Grecian. Nothing is more certain than that when a business pays very large profits, its race is nearly run, as the copyists all take it up.

Closely associated with originality, is self-reliance. A person may get along very nicely as long as he has some friends to help him, but when thrown upon his own resources he finds himself to be defective and fails because he has not trained himself to do the best he can and leave the rest undone. He is the one that is hoping that some rich friend will die and leave him a large inheritance; he wants the government to make laws to help him and fails to realize that "no law which the wit of man can devise can make the idle industrious, the thriftless provident, or the drunken sober." The men who are best able to judge tell us that it is not helps but obstacles, not facilities but difficulties which make men. Yet parents will toil night and day in order to gain something more than a livelihood in order to be able to give their children a start in the world; they succeed thus far, but the start is about as often in a downward as an upward direction. The knowledge that we shall some day inherit unearned property is almost certain to dull our energy.

We sometimes meet people who imagine that they are so weak and inferior to other people that nothing good can be done. To those, I would beg to hold forth one whose thoughts have had, are having, and will have a world-wide influence and yet it was said of him, "his bodily presence is weak, and his speech contemptible." I refer to Paul. If a person relies on his own resources, he soon finds out that every moment must be put to good account and learns therefrom the great lesson of industry. He finds that his great talents are improved and his moderate ones have their deficiencies supplied. "Industry supplies the want of parts, patience and diligence, like faith, remove mountains." Men complain of not being able to secure a position, but "it always has been and always will be more difficult to find talents for the places than places for the talents." There are many men who possess first class ambition

and third class powers. Shakespeare says, "It is not in our stars but in ourselves that we are underlings."

It is the one who takes heed of the small things and does not trust to luck who succeeds. A loss of time must always be carefully guarded against for it is making use of the spare moments that enables us to get ahead of our competitors. "Lost wealth may be replaced by industry, lost knowledge by study, lost health by temperance and medicine, but lost time is gone forever." In the words of Franklin, "Dost thou love life, then do not squander time for that is the stuff life is made of." Elihu Burritt acquired a mastery of eighteen languages and twenty-two dialects, not by rare genius, which he disclaimed, but by improving the bits of fragments of time which he could steal from his occupation as a blacksmith. It may not be squandering time to take an occasional day off for an outing, for with many of us it is no paradox to say that we are in such a hurry to live, that living in any true sense of the term becomes impossible. The farmer and laboring man needs more intellectual work, while the teacher and student needs more physical culture. It is the sound mind in the sound body that achieves success.

A young man must also have "decision of mind, but this, like vigor of body, is a gift of God; it cannot be created by human effort; it can only be cultivated." Our whole future often depends upon the decision of a moment. A moment lost, and all is lost. The difficulty has to be conquered or it will conquer us. If we conquer we will be strengthened by the effort. If it conquers us we will be weakened and be less able to wrestle with the next difficulty, and before we are aware of it we are on the downward road to ruin. Victory or failure may always become a habit with us which will either lift us up beyond even our own expectations or drag us down to depths lower than the deepest seas. Metastasio held so strong an opinion as to the power of repetition in thought and act that he said "All is habit in mankind, even virtue itself." The bond which habit binds you with becomes stronger the longer you practice the habit. Beginning with cobwebs, it ends with chains. We may acquire habits of study as well as those of loafing, if we only start right. The six most important habits in business, ones that are worthy of careful cultivation are—"application, observation, method, accuracy, punctuality and dispatch."

A person may possess all of the above named qualities and yet not succeed, for the reason that he does not have proper manners. Whole books have been written on the subject, but the matter is epitomized in the golden rule—"Do to others as you would have others do to you." "It has been truly said that spite and ill-nature are among the most expensive luxuries in life." How true it is that "He that ruleth his own spirit is greater than he that taketh a city."

If we get cross, we should never show it. A little act of kindness has frequently made a man a fortune. Mr. Butler, of Providence, R. I., opened his store one night after all the doors were locked to give a little girl a spool of thread. His act of kindness became known and spread like wild-fire over the town and resulted in bringing him a large increase in trade. We must be gentlemen at all times; we must copy after our Saviour, who was reverently styled by an old English poet, as the "first true gentlemen who ever lived."

All of these things seem nice to talk about, but there is probably no one who realizes the difficulty of putting them into practice more fully than the speaker. Back of it all there must lie a hidden yet divine force which is usually termed "will power." "Wherever there is a will there is always a way." Some years ago an English carpenter was asked why he took so much pains in planing the magistrate's bench, which he was then working upon. His reply was, "I want a smooth bench to sit upon when I become magistrate." In after years, he actually became magistrate and sat upon the very bench he made so carefully in former years. That is an example of what "I will" can do. Sir Thomas Fowell Buxton says "The longer I live, the more I am certain that the great difference between men, between the great and the insignificant, is energy, invincible determination." An honest purpose once fixed, and then victory or death. This quality will do anything in the world and no talent, no circumstances will make the two-legged creature a man without it. Men having this quality will be helped by opposition. As the height to which a rubber ball rebounds depends upon the force with which it is thrown upon the ground, so their success depends upon the opposition they receive; the harder they are opposed, the harder they will work. Matthew says, "The school of adversity graduates the ablest pupils and the hill of difficulties is the best of all constitutionals for the strengthening of mental backbone. Great men can no more be made without trials than bricks can be made without fire." Study the lives of many of the noted men of this country and you will find that they had to struggle for existence when they first started in life. Franklin, Patrick Henry, Clay, Webster, Jackson, Lincoln, Grant and Garfield were all the sons of poor parents.

We should not give up if we fail in the first attempt, for many men have become noted for things in which they made utter failures the first time. Daniel Webster is a most striking illustration of this. As a schoolboy he would commit a selection to memory, but when the time came for him to stand up in front of the school to declaim it he was unable to rise from his seat and remained speechless. A number of most thorough preparations ended in the same way, but he continued in making an effort, and now, although dead, he lives

in the minds of the people as one of the greatest orators America has ever produced. "No man can end with being superior who will not begin with being inferior."

We must learn to labor and to wait; let us do our duty and not worry about results, because worry kills more men than work; and again, if a man wants a higher salary, let him do his work in such a manner that his employer sees that he is worth more and thinks that he cannot get along without him, and the salary will come without his asking for it. We must have the same determination to succeed that Thos. Carlyle showed when he had his first history of the French Revolution, which took him several years to complete, burnt by a maid-of-all-work in the house of a friend to whom he lent the book; instead of giving up in despair, he set right to work to get out another volume which, without a doubt, was far superior to the first volume and served to give him his reputation as a historian. Audubon had his work on American Birds eaten by two Norwegian rats, but replaced it in three years. When a lady once asked Turner what his secret was, he replied, "I have no secret, madam, but hard work." This is a secret that many never learn, and they don't succeed because they don't learn it. More pay and less work is what most men are after. All occupations have some unpleasant work about them that has to be done, but, as Douglas Jerrold says, "the most humble work or trade has some pleasant side about it, for if I were a grave digger or hangman, there are some people that I could work for with the greatest of pleasure."

After saying so much of how to attain success, we might consider for a few moments what success and failure is. Matthews says, "True happiness consists in the acquisition and not in the possession; man was made for activity, and by pursuing what he wants we get this needed activity." Success in life should be considered as a means and not as an end and we should never lose sight of the fact that contentment is more than kingdom. Was the only divine life ever lived on this earth a success humanly speaking? Are you entitled to pronounce your fellowman who has humbly tried to copy it a cipher, because he has not, like you, courted applause and made some little nook or corner of the earth ring with his name? There is no possible valuation of human character which would make the slightest showing in the stock-list and hence success, truly understood, must be sought, not in what we have, but in what we are. It has been said that we do not choose our own parts in life and have nothing to do with those parts. Our simple duty is confined to playing them well; and when we shall have done all the things which are commanded of us, we are to say "we are unprofitable servants, we have done that which was our duty to do."

EDUCATION FOR THE ADULT FARMER.

By DR. WILLIAM FREAR, *State College, Pa.*

Mr. Chairman: I hoped I might be excused from delivering an address this evening, but I shall try to make my remarks brief, because we have a very long programme.

When I speak of education of the adult farmer, I speak of education in different ways. When I speak of the education of the artist, the education of the poet, and the education of the clergyman for his calling, I am at once thought of as speaking of a school; and so of training in law, or training in physics, or in aesthetics; and so it may be thought at once, What does the man mean when he speaks of the education of the adult farmer? Now, we understand, of course, that in this enlightened land of ours, everyone must have some education; and, if we meant schooling, such as given to our youth, we will grant that the farmer must have it. And, in the next place, why necessary to speak on such a subject to the adults of this audience?

When I speak of the education of the adult farmer, I have some other thoughts in mind. We all strive for success in life, and to each it may have a different signification; it means something distinctly different, as the individual differs one from the other. Many men measure as the degree of their success their cash; but when they come to look at the truth of their own success in life, wherever they have found themselves successful, they have discovered that success is not measurable in such small terms as this; but, as has been already said, it is the result of that degree of usefulness which brings the true contentment and happiness that can be obtained on this mundane sphere.

A man's success is not measured by what he has, but, as has been stated by the last speaker, in what he is. Now, success in a business does not depend simply on the amount of cash you get from that business. The man that goes out with the idea that for this day's work he will get one dollar and a half or two dollars, or, if he is a high priced man, twenty dollars for that day's work, and then measures his success by the number of dollars he is getting for the number of hours he has given, has a very poor idea of what success is in life.

That man is happiest who, possibly starting out with that idea of success, gradually becomes interested in his work; gradually sees that the work is worth doing well, rather than the return of dollars and cents. He thus advances like the humble bud, which gradually develops under the sunshine of spring into the beautiful flower; and it is to him the colors of the rainbow, and as pure and spotless as the lily, whose work comes to him a beautiful thing, even if it brings nothing but a most meagre financial return. The man who does not have an education for his work is simply unable to see the duties that lie in it, or to see the utilities in it, and so is unable to gain a beautiful conception of the work that he has to do.

Now, if we look at the lives of the apostles, we will find that one of them, to whom reference was made just a few moments ago, as possibly a person of another order, was above all the rest, the successful and the initial man. And if we look at the life of Saint Paul, we might possibly find those long days, that he sat at the feet of Gamaliel, as affording possibly some of the explanation. If, then, he was in his own mind contemptible of speech, he no doubt learned logic and oratory; and in the spirit of it he found the secret of that success that led him to say in that spirit to the Romans, "I magnify,"—not himself, but his calling. And if a farmer is going to succeed, he must magnify his calling; he must not allow his own dissatisfactions, his own temporary disappointments, or the cavils of others, to disconcert him for one instant, or lower his ideal of the usefulness of his work, or what is worthy of himself in its doing.

And now I would like to add to that a thought, to help us realize possibly a little more fully what the work of the farmer is. People have often said to me, "What does a farmer need to know? What does he need to spend time in study for? As though farming was done by mere rule without change; as though the forces of nature with which the farmer has to contend were not at all subject to control, instead of being, on the other hand, placed here just as were the animals in the garden of Eden to become the subjects of man, his master. We look around a country community to seek for the highest educated man of his calling, and we agree very possibly on the country physician, with a country school education, an academic or college course, and three or four years under a specialty. And what is he taught to do? To try and keep an animal going, whose nature is, as anybody knows, that he shall go down and stop ultimately. How about the farmer? He has but a different species to keep going, and over animals whose highest qualities and capacities are scarcely known to-day. He has developed by appropriate methods the Short-Horn, with the luscious porterhouse steak, the beautiful Hereford for equally good roast beef, and the large milk producing Holsteins, together with the delicate and beautiful Channel

Island cattle, with the rich fat in the milk; and with the same methods he has taken and developed the Cotswald, or the fine Merino sheep, and has determined the size and shape of the lapel that he shall wear; and through long years he has produced these results of magic.

What did the Creator mean when He made this wonderful heart of ours, but to impress his matchless work upon man. And what is the farmer doing, but becoming, as it were, a sort of assistant creator, to impress at his end the thought—the idea—which he has in his brain. And so we may well magnify our calling; we may well find in it the incentive to our greatest and highest education.

Now, there is another reason why the adult farmer should be educated, and his calling be a calling of importance; and that is for the reason of the youth in the land. We wonder why the boy leaves the farm. I do not wonder at all. My wonder is that so many stay on the farm, when we hear as much as we do in country communities of the utter hopelessness of the occupation of the farmer. When the boy is led to believe that success on his farm consists in being a little more advanced—that is, in supplying the mental faculties with food a greater number of hours a day, instead of applying more hours to muscular work—that the mastery should be of the mind, and much more than heretofore, then there would be a different tale to tell, and one far more satisfactory.

Now, if we older adults will not show in our lives an appreciation that brain is as potent in farming as any other occupation in life, we cannot expect these aspiring young fellows to become enthusiastic and anxious to take hold of an occupation which will bring them the least return on the money and labor invested. After we have worked in this way, we cannot expect them to remain where the results of their efforts do not promise more to them, and they in addition to remain as mere tools in themselves. We must impress as of the first importance a careful study of the fact that, above all the productive callings of the land, farming gives a field for the exercise of the highest brain power.

I will merely touch upon another reason why the farmer of to-day should apply the highest education to his farming, and that is because he is compelled to from a business standpoint. So long as others did not, it was not necessary for us to apply more brain than it was our pleasure to apply. But what business in life, or where is the business man who is competent, where he does not apply to his business a bright mind as well as muscle; and who now considers a farmer is just as competent without the former of these qualifications, if he has the latter? Now, I will not stop to show how this is. Every one of you will think of instances in your own experience showing clearly how important this fact is to each of us.

We will, however, consider very briefly the ways of other men who have been considered competent, but who have been led from darkness into light, that success comes not by the exercise of more muscle, and working more hours of the day with the muscles, but by applying brain properly; by applying labor saving methods; by applying that which would save material, and by utilizing material in new ways. Some of you have been visiting the paper mills and the silk mills; and I need not stop to suggest to you what you saw there for saving labor, in making one pair of hands with brains do a great deal more than fifteen or twenty pairs of hands did thirty or forty years ago, and in some instances doing more than forty or fifty could have done at the time mentioned; and, furthermore, the ability to turn into white sheets of printing paper pieces of wood that twenty-five years ago we burned up, because we did not know what to do with it. On the farm we have this same field for the application of those methods—not as large, perhaps—by which manufacturers have been able to thrive in the face of competition.

Having merely outlined the thoughts which I have been accustomed, under the same title, to give to others, I will close with an anecdote, which some of you have heard, but which will serve to illustrate somewhat my idea of the present as compared with the past, and the methods which the farmer must use if he would succeed. Some years ago the father of a gentleman, known, I think, to nearly all of you, was on a visit to the Sahara. The late Senator Gerard C. Brown's father was one of the first men to engage in the business of purchasing wild animals for the menageries of this and other lands. On one occasion he was traveling over a part of the Sahara Desert with some men, going to a place to get supplies. He was the only man supplied with the best fire-arms. He was fortunate in having in his possession one of the most modern weapons, a newly invented magazine gun. About mid-day he was attracted by a number of dark objects appearing above the horizon. As they came somewhat closer, he found them to be men mounted on horseback; and, turning to his men, said to one of them, "Billy, who are those men?" The man replied, "They are hostile Arabs." Now, any one who knows what a hostile Arab is, also knows that the band coming toward them was a band of thieves and murderers. After thinking a moment, Mr. Brown turned to his interpreter, and said to him: "Billy, I wish you would shout to those people, and tell them that they had better pass us by; as we are out on business, and it is not worth their while to disturb us." The interpreter did as he was told, but without any effect, for the Arabs formed for attack. Their method of warfare is to ride in such a manner as to circle around the party they are about to attack, gradually closing

in on the ill-fated band; and so they began to gallop their horses, each man leaning forward on his steed, with a long lance in his right hand, grabbing his animal around the body with his heels, and holding on to the bridle or mane with the left hand. As they galloped, circling around closer and closer, it was observed that they numbered about twelve men, with their spears. As they kept gathering closer and closer, and Mr. Brown, seeing that they were not going to obey his injunction, he told his interpreter to tell them to stop, or he would shoot. This the interpreter did, but their actions were such as to indicate that they were unfriendly, and would without hesitation slay the whole little party in cold blood. So this typical American, having had experience in such things before, raised his gun and aimed at the man supposed to be the leader of the foe. On firing, the man dropped to the ground. The survivors closed in in one solid phalanx on the party, nearly every member of which trembled with the expectation of instantaneous death. But with that same American nerve, and with that same steadiness and accuracy of aim, our American friend fired again from that same magazine gun, without reloading, and he continued at this work until five more men had gone down. Then the apparent leader of the survivors, realizing that this was a new fire-arm, had them draw off to a safe distance, to escape the seemingly inevitable consequences. Then they were seen to gesticulate, and after a short parley, on the end of one of their lances was elevated a white rag. Then one of them rode to within hailing distance, and called: "How often does your master load his gun?" The interpreter, without waiting for instruction, replied, "Once every new moon!"

Pennsylvania farmers, what shall we have, and what shall we do, to meet the competition which we are bound to have in the next twenty years, if not in the next decade? What are the boys, growing up on the farm, going to have to compete with that which they will have to contend against within the next twenty years? Shall they have the long lance of the Arab—the appliances of your great grandfathers—or shall they have the magazine gun of modern resources? It will rest for you to determine. I trust it will be the magazine gun.

THE SILO AN ECONOMIC.

By THOMAS J. PHILIPS, *Atglen, Chester county, Pa.*

The wonderful development and change of the present generation is as apparent in the country as in city or town. The passing from scythe and cradle to mower and self binder marks a new era as distinctly as the trolley car or arc light. The rich virgin soil of the prairie offers its produce in our own markets, cheaper and better than we could produce them a few years ago. And we owners of the older and worn-out acres feel the competition keenly, and are forced to direct our attention to something that will yield income without further wasting our resources. The dairy has become almost universal in this and neighboring States. The general purpose cow of our fathers has hid herself in the mountains, and a new butter making machine has taken her place. The merit of this new machine being recognized, her food and environment required attention. The quality of her product being established, the progressive dairyman directs his attention to quantity, and through his ability to feed into this machine crude products cheaply depends his success. The number of pounds of dry matter she can assimilate has been calculated to a nicety, also the proportion of food necessary to build up the waste in muscle, fat and energy, and at the same time furnish the greatest possible amount of butter-fat, is a never exhausted subject at a Farmers' Institute.

When the produce of our own soil or that purchased from other farms, can be transformed into milk in quantity and quality at a price that will afford a profit on the money and labor invested, the business is a comfortable one; therefore, it is equally important that the cost of the food be reduced to the minimum, as it is that the finished product shall command the highest possible price. If you will indulge me a few minutes I will try and explain from the standpoint of a Chester county farmer. Though only an hour or two from the great cities of the east, our goods sell upon their merits, in competition with yours and every other dairyman. If we have the advantage of cheaper rates of freight to market, we are handicapped by the increased cost of our feeds, higher priced lands, more expensive living and decreasing fertility, or what amounts to the

same thing, continual expense to maintain or increase the productive quality of our farms. We are forced by sheer necessity to direct our attention to economics in a dozen directions that were not dreamed of when I was a boy. Thirty years ago, when I milked my first cows, their product sold for a price we never even hope to receive again. The shrinkage was gradual, but finally reached a point where there was absolutely no margin for profit. Staring the situation square in the face, I found that a cow consumed about 28 pounds of dry matter each day, and in order to get it into her I divided it into bulky, ruminating food 18 to 20 pounds, and concentrated food in the shape of grain 8 to 10 pounds per day. But the quality of these foods furnished such varying results, differing in different animals, that I was again compelled to consult the cow not only as to her appetite, but as to her ability to digest and assimilate that food. Dry hay and corn fodder, excellent in themselves, required too much of the vitality of the animal to convert a sufficient quantity into blood. I experimented with moist, partly digested corn in the form of ensilage, with excellent results. And after six years experience would not know how to keep a dairy without a silo. Having a silo it is possible to do either of two things: Keep more cows on a given number of acres, or keep the same number as under the old system, but keep them better and much cheaper, and release all hay except clover for sale, thus adding another money crop, and a profitable one.

The wholesale markets have returned us from 12 to 14 dollars per ton for timothy hay this year; an average cow will eat 15 pounds of this hay per day and 5 pounds of cut corn fodder in addition. The hay is worth $9\frac{1}{2}$ cents. I can substitute 28 pounds of corn ensilage, which furnishes about the same number of pounds of dry matter, in a much more palatable and digestible condition for $2\frac{1}{4}$ cents, including all proper charges and expenses, thus saving $7\frac{1}{4}$ cents per day per animal. This calculation presumes that an equal quantity of concentrated foods are used with both the hay and ensilage, but as a matter of fact the ensilage contains not less than 2 to 3 pounds of corn, and that much of the carbohydrates can be deducted from the grain ration with equal results, adding $1\frac{1}{2}$ cents per day more to the profit account. The saving of $8\frac{3}{4}$ cents per day during the 180 feeding days of the year, when there is neither pasture or green crop substitutes, in feeding the 937,000 cows in Pennsylvania, as shown by the census of 1890, means a gain of \$81,987 per day, or a grand total of \$14,757,000, a sum three times greater than that lost by the use of oleomargarine and other butter substitutes. What proportion of the almost one million cows in this State are kept in herds of 10 or more, I have no means of knowing, but it can readily be seen from the above figures, the result of my

own experience and practice, that it certainly will pay every dairyman having ten or more cows to build a silo and feed corn ensilage. Even though he has to borrow the money, he can make no investment that will pay him a greater profit. The one I built six years ago has paid for itself six times.

A silo is an air-tight building or place to store fodder, corn, clover, rye, or other green food, preserved in such a manner as to retain a large part of the qualities of the original product. We borrow the idea from the French; there the thrifty farmer of ten or a dozen acres is accustomed to store his crop in a pit in the ground and exclude the air by putting on weight or pressure. And the early silos of this country were constructed almost entirely below ground. These were usually long, narrow, shallow walled pits, but did not prove satisfactory as to keeping silage and were inconvenient to feed from. These defects were soon remedied; that stone cemented box was turned on its end, giving height and pressure, and if the corners were rounded the transformation was a perfect success. Perhaps that is too strong a term to use in connection with any stone silo. Very rarely, indeed, do they prove entirely satisfactory, though many are still used; when the walls are lined with wood, conditions improve. The round or tub silo is doubtless the cheapest to build; that is, it will cost less per cubic foot of capacity than any other shape. But a silo is usually filled in from four to eight days, in good weather, but is emptied daily through the cold and storms of winter, which is the real labor. And the location and shape should conform to the convenience of feeding. Outside of the barn, but adjoining it at one side of the driveway, is possibly the place best suited on most farms. The one I am most familiar with is thus situated, rectangular, 20 feet by 12, and 25 feet high or deep, 9 feet below the ground surface and 16 feet above, with the acute angle taken off—two of them being built that way, the others being used for ladders and funnels, made by adjusting separate boards as the filling goes on, like the boards of a granary, and removing one at a time as they are exposed when feeding. They deposit the silage at two points directly at the cows heads. 'Tis no more labor to throw down and feed a bushel of ensilage than a rack full of hay.

As ensilage is the product of a foliage plant, and corn gives more tons to the acre than any other crop, we can raise, it should be our aim to produce the greatest possible quantity consistent with quality. All parts of our State are not equally good corn lands. A variety that will yield 25 tons per acre in the southwest would not mature at all in the northwest. In Lancaster and Chester counties some varieties of the southern white grains are always used. My preference is the white horse tooth of Virginia; it bears one good ear, occasionally two; grows very vigorous and tall; on ordi-

narily good soil, with fair culture, it yields 20 tons per acre; five acres will produce 5,000 rations for one cow; planted in rows 42 inches apart and 8 or 9 inches in the row, makes stiff, handsome stalks 14 feet tall, that will withstand all ordinary storms. When the grains have passed from the milky to the putty condition and the more mature ears show traces of brown on the husks is the time to cut off close to the ground, run through a cutter, distribute the stalks, blades and grain evenly over the whole surface of your silo, tramping enough to detect the soft places, keeping the middle full. If very dry, over ripe or frosted, add a fine spray of water, either on the elevator or sprinkle in the silo. When full, pull off the ears from the last load, feed them to the cows or pigs, cut the fodder and gather up all offal and waste and put on the top; wet thoroughly (a barrel of water will not be too much), tramp solid, sow half bushel of oats over the whole, and the job is finished. A mouldy crust of 6 or 8 inches will exclude the air from the top in a few days and form an air-tight covering. It will heat up to 120 degrees and settle two feet or more. When the lid is removed, you have the cheapest and best bulky food for a dairy cow that I know anything about, except clover hay. Why will farmers feed a ration costing 22 and 25 cents per day and cry hard times, when he can get equally good results from 13 cents per day? Yet they do, and I fear always will.

I have spoken of corn silage and winter feeding only, because I have had no experience with any other. I represent a grazing farm, where we pasture 50 head of dairy stock through the summer months, and only want an economical feed for the winter. The silo enabled me to sell already this crop year, hay enough to pay the entire cost of that silo, \$209, and yet have 18 tons baled ready for shipment. Possibly I have told the most of you here nothing new, but if we, as farmers, add variety, coupled with profit, to our business, reduce the hours of labor, stimulate our brains, aiming to reduce the cost of our products, rather than increase the quantity, we have solved, in a great measure, the future of agriculture and determined who will succeed to the acres when we are done with them.

THE RELATION OF THE WHOLESOMENESS OF THE STABLE TO THE HEALTH OF ITS INMATES.

By DR. LEONARD PEARSON, *State Veterinarian.*

During the past decade great progress has been made along dairy lines and most important improvements have been effected in regard to feeding cattle, increasing production, and in caring for milk. Bulletins, papers and speeches almost without end have been written or delivered on these subjects and the advice thus freely given has been followed by so many dairymen that milk is now produced at less cost and in better condition than ever before. There is still, however, much room for improvement in this direction. Many cows are maintained at a loss by the farmers of Pennsylvania, the special nutritive needs of animals kept for different purposes are unrecognized by many feeders, and milk shippers and butter makers are still annoyed and exposed to loss through receiving milk of poor quality. But the foundation principles are now widely known and improved methods have been taken up by some one in almost every community, so that it is clear that heaven is working and that improvements will be made at a more rapid rate from now on.

To accelerate the rate of improvement and to inaugurate new reforms for the benefit of farmers is, I believe, the purpose of everyone present at this meeting. If this is true, suggestions as to needed and practical reforms will not be out place. It appears that there is always a tending to lop-sided development and, in this connection, the doctrine of producing the greatest possible amount of milk at the least cost for feed, regardless of every other consideration, has been preached so forcibly and so persistently that almost every other factor in dairying has been pushed into the background. I beg to suggest that the chief element in the dairy industry is the cow. The first consideration should be for the cow. The cow should be the best that can be had and should be kept in such away that she will be constantly in a condition of good health and high efficiency. This means that the functions shall be normal and free and this is possible only when the physiological needs

of the animal are studied and met. That these needs are not generally recognized, is clear to one who considers the manner in which the majority of herds are cared for and housed. When it is suggested that certain improvements should be made, a common remark is that farmers cannot afford to improve their barns and premises with milk, selling for the low price that it does. While this is no doubt true, in large measure, it is not the principal reason for failure to provide more sanitary stables, because new stables are built every now and then and the better arrangements that could be introduced without increased cost are frequently neglected. Hence it is clear that there is not at this time the general recognition of certain needs of the animal that must prevail before important advance can be expected. Without going into this subject to a greater length than is permitted in this paper, I can scarcely do more than enumerate the chief factors in this problem.

First—LIGHT. If we judge the appreciation of the value of light as a health preserver and health giver by the amount of it that is admitted to the average stable, we must come to the conclusion that it is generally regarded as injurious rather than beneficial. Even in new stables the glass area is restricted to exceedingly meagre proportions. Who is comfortable in a gloomy, darkened house? We all know the depression caused by such surroundings and also the enlivening and cheering effects of light. Light has a direct effect on metabolism, on the resistance of the tissues to disease producing organisms and influences and on bodily vigor. Light is a disinfectant. Every one has noticed that fungi and other lower members of the vegetable kingdom grow in dark places and that they are killed by sun light. To cultivate bacteria in the laboratory it is necessary to keep the tubes containing them in the dark. If exposed to the sun the creatures die. There is an important lesson in this observation, and a powerful argument for light in the stable.

Moreover, it has been shown by direct experiments made at the laboratory of the State Live Stock Sanitary Board that like animals kept, fed and exposed to disease in the same way, except as regards light, will live considerably longer when kept in a light place than when kept in the dark.

We have learned that light is necessary in the house, and we should learn that the stable should be flooded with life-giving, healing sunshine to a larger extent even than the house.

Second—AIR. Air is food. The great need of the system for air is shown by the promptness with which an animal will die when deprived of it. Contaminated air is even worse than contaminated forage. Every one has experienced the evil, depressing effects of breathing the vitiated air of a crowded and poorly ventilated hall. If the conditions producing such depression are continued long

enough the effect will be permanent. Bad air lessens the vitality and strength of animals that have to breathe it. It reduces their ability to resist disease, it irritates their respiratory tracts and it interferes with nutrition.

There is little excuse for subjecting animals to an unbalanced ration of air. The supply is plentiful and universal and will be within the reach of every animal unless it is deliberately excluded. The fact that it is so frequently excluded shows that this cheapest but most valuable of foods and of medicines is not appreciated at anything like its true value.

It is impossible in this short paper to describe the principles and practice of ventilation—that must be a separate task.

Third—EXERCISE. Perhaps the subject of exercise does not strictly come within the title of this paper, but it is so clearly related to the other topics that it can scarcely be disregarded in this connection. To be brief, it is well known that exercise of any part of the body leads to development, and disuse leads to atrophy. Without exercise, the muscles, lungs and heart cannot be properly developed, the body cannot be properly nourished, there is but little ability to resist unfavorable conditions of life, and decay, disease and death result. It may be economical for a time to keep cows without exercise, but as a permanent system of herd management it is sure to lead to disastrous results. We cannot expect to rear cattle having well developed lungs, strong hearts and active functions if they spring from ancestors that do not have these necessary qualities. And all of these depend on a sufficient amount of bodily exercise. It is often said that exercise lessens milk flow so much that it cannot be allowed profitably. This is an error. The cows that have made the greatest milk records have been exercised. Cows give more milk when exercising at pasture than when tied up in a stall. It has been shown that cows of the Simmenthal breed in South Germany that do the work of oxen are profitable milkers and that the flow of milk is not lessened materially by the hard, muscular work they have to do. The most severe test is the one that is long continued—the test of time. Can any advocate of the practice of keeping cows without exercise point to a herd that has been kept in this way for fifteen or even for ten years that is not now composed of small, delicate, poorly developed and unprofitable cattle? I submit that a plan of herd management that destroys the quality of a herd in fifteen years should be discarded.

Fourth—COMFORT. To do her best, a cow should be comfortable. If the animal strains without avail to gather up the food that has been pushed beyond her reach, if she is unable to turn her head to lick the place that is a source of annoyance, if the stall is too narrow or too short or the floor too uneven for comfortable repose, the

animal cannot be expected to do her best. It is easy to arrange comfortable ties, mangers, floors and other fixtures and all of them return a good rate of interest on the cost through the benefits that come from peace and contentment of the cow.

Fifth—CLEANLINESS. The great struggle for the milk producer in these days, and it is a struggle that will become stronger in the future, is to keep the number of bacteria in the milk within the narrowest limits that are possible. In this effort, many things are done that increase the wholesomeness of the stable. By keeping down the bacteria bearing dust, the germs of disease are at the same time repressed. Conditions that are most favorable to health are least favorable for bacteria. Briefly, some of these conditions are: The absence of rough surfaces, deep recesses, cobwebs and the like that harbor dirt and bacteria; water-tight floors and gutters; good drainage; careful and complete removal of manure, etc.

During recent years it has become the habit of many sanitarians to refer to the germ diseases as filthy diseases. Much can be said in favor of this phraseology. The germ diseases find the conditions best suited for their spread and development in dirty places. If cleanliness is not next to godliness it is at least next to wholesomeness. The value of good sanitary construction as opposed to the old stabling conditions has been clearly and forcibly shown by the experiments, previously described, carried out by the State Live Stock Sanitary Board. By these experiments it is shown that good air, light and cleanliness are important and powerful factors in checking the progress of tuberculosis and in promoting bodily vigor.

If any one has the opinion that good stables are necessarily expensive stables, he should disabuse his mind of this false idea. The difference between good, wholesome stables and stables that promote rather than prevent disease is not so much in cost as in an appreciation by the builder of the value of light, air, comfort and cleanliness.

THE SOIL OUR PARTNER.

By HON. ALVA AGEE. *Cheshire, Ohio.*

There are few sorrier spectacles than the man who, owning a portion of the tillable land of the earth, and dependent upon it for income, looks upon the soil as a lifeless thing and upon farming as

a lifeless occupation. It were just as well for him, and better for agriculture, if he, too, were lifeless. The ownership of land is a privilege not accorded to a majority of human beings, the mass of humanity working for a fixed wage that meets only the bare necessities of life. Single-handed the wage-earner works at others' dictation. The man who owns some land, and gives himself to its tillage, finds himself engaged in intellectual work, in full partnership with a living soil that must be fed even as he must be fed, and that will then help him to secure an income in proportion to his ability in solving the problems that arise in aiding the soil to do its work. Mental drones may continue to vex and harrass an honest, well-disposed soil, and reap a meagre harvest while branding agriculture as the natural work of the dullard, but their number must grow less under the competition of those who see what the soil would do for them if they could understand it and give it a chance to do its best.

In the partnership formed by the soil and the farmer for the production of crops, each furnishes some capital, the farmer providing the smaller part of the material capital, but assuming control because, presumably, he furnishes some brain power. The control is characterized by inefficiency, even in the case of the most studious.

What does the soil furnish? Many things. I name only a few.

1. Each acre of agricultural land furnishes tons of the mineral elements essential to plant growth. Of the ten essential soil elements, it provides in nearly every case six or seven in abundance in available form. Of the remaining three or four, namely, nitrogen, phosphoric acid, potash and lime, it provides tons in an unavailable, inert form. Let us fix this fact in mind, and keep it ever before us. All of the elements of plant food in commercial fertilizers and stable manure are in agricultural soils in quantities per acre measured by the ton. They are there in insoluble forms. The soil is not helpless when left alone, and its gain by partnership with man depends upon the degree of man's intelligence. If the man does not understand, the soil can do better shifting for itself. It will then use weed seeds to produce a growth that will shade it so that favorable chemical changes within may occur. It will receive gain from acids used by the roots of the weeds. It will have the mulch made of leaves and stalks. It will be put into condition to admit air, and to hold moisture. It will do the work of changing tough plant food into available fertility without aid of man, but must work slowly. Man can interfere and make the condition worse, or make it better, hindering or hastening the process of renewal, according as he has ability or lacks ability. If he continue to rob the soil of the plant growth it provides for its own feeding, the poor, crushed soil becomes heartless and practically dead. If he help it to seeds of plants superior to its own weeds, and lets these best plants do their full

work of releasing fertility, the soil is the gainer by the partnership. It is an awful thing to be unequally yoked with a fool, and if soils could talk, some men would have to leave the neighborhood.

2. It furnishes moisture. This is a big undertaking. The plant food of the soil enters the tiny mouths of the feeders in solution. It is water that runs the machine. The plant food goes to its place, and the water passes into the air. The soil furnishes to the plant and air, through transpiration and evaporation, 300 to 400 tons of water to secure one ton of dry matter in our crops. In a short paper that befits such an occasion as this, there is no time to catalogue all the many offices performed by the silent partner in the production of crops. We emphasize the supplies of mineral plant food and of moisture, and the soil's ability to improve its own condition in most cases, gaining in capability when man does not meddle, and gaining faster when a wise man assists.

Let us turn to the other side of the partnership. What does the studious, intelligent farmer furnish?

1. Control of soil moisture. I name this first because it is absolutely first in importance. The rains of the year are used by the soil as a source of supply. Deep down in the earth is stored the water of winter and spring rains for use in the time of stress, when the plants are employing moisture freely and the hot air is a robber. Then it comes to the surface to replace the portion used by the air, and the soil thus provides for its plants. But the control is inadequate. There is excess or deficiency. The man that assumes to control in the partnership, and would have net income, prevents excess by underdrainage. Such investment, when needed, is usually very profitable. I pity the man and the soil that work together in the mud. All chance of profit is drowned before the harvest. Solomon says that the "borrower is servant to the lender," and debt is sickening, but I borrowed money for my first two miles of tile underdrainage, and found it the means of accumulating a little capital. If the supply of moisture promises to be inadequate, then it is conserved by a mulch. Material is placed between the water that rises and the hot air above. In the flower garden leaves may be used. In the truck patch I have used rotten straw. In the field the practicable material is earth so loose that moisture can not be lifted through it to the air. All these materials are good, but only the last is practicable in field culture. This calls for the use of the weeder, the harrow, and the cultivator with fine teeth set to run shallow.

2. He sees that humus is provided. The soil can do this of itself only slowly. It has no choice of seeds, but must take what winds, water, etc., bring to it. The farmer provides the seeds of plants capable of furnishing rich organic material. This is to the soil

what heaven is to dough. It changes a disheartened, dying soil into a hearty, hustling, live soil. It is that which makes the difference to-day between unprofitable and profitable land, nine cases out of ten.

He unlocks the stores of inert fertility by remixing the particles and airing them. The air is life. It is by means of plow, harrow and other pulverizers that he secures the change in the relative position of all particles and the admission of air so that chemical changes may occur. It is tillage that fits the soil to be a winner. Tillage to the soil is what exercise is to the prisoner of the cell. It is the difference between a living death and physical vigor.

4. He supplies some readily available plant food when the soil has failed to have on hand a full amount in available form. This is very often the case, because the soil has been handicapped in its work along this line by a lack of suitable plants, or of air, or of water, or of time by reason of man's greed of immediate returns, or possibly of original stock of some element or elements. Again is intelligence at a premium. If profit were not a consideration, the farmer could dump into the soil all the elements of plant food. But profit is a consideration—the one big consideration with most people. The man must learn what element or elements in available form are lacking. He must either bring this from a distance and give it to the soil for its use, or he must be wise enough to apply some material that will by chemical action unlock the stock the soil has on hand. Usually he does both in a single act—supplying an element of plant food which in itself, or its carrier, unlocks as well as feeds. In this work of fertilization are problems too big for lawyers and doctors, and almost too big for studious farmers.

5. He furnishes the seeds of plants. In this he presumes a good deal unless he has studied the tastes of his partner well. The soil has not only its preferences, but there are some plants it can hardly produce at all. Few of us ever learn the possibilities of our soil in the way of income because we do not provide the seeds for the crop best adapted to the soil for income-bringing. Our trick is to plant the crop we have the habit of planting, and then kick if returns do not satisfy. It is a kickety-trickety way of farming that makes the soil tired. Into what plants can the soil of this field and that one put the most money? A problem full of delight to a man sufficiently intelligent to possess a moral right to boss an industrious soil.

6. He furnishes protection to the plants from insect and fungous foes. The soil would hardly need such protection for its products if it were running a rotation of crops. There would be such variety and so much less invitation to attack by concentration of plants that insect and fungous foes would get a less sure establishment. As it

is, man turns to the experiment station for assistance, and becomes an adept in the use of insecticides and fungicides, or else does nothing but lament that times are not what they once were. With all the aid of science, there is room for lamentation too often.

He does more. He does that he should not do, and leaves undone that he should do—too often. But it is a glorious thing to be in control of a part of God's earth—to study, to plan, to try, and to win in some measure—each year determined to be more intelligent in that control. He who will not do this should go to the city or get off the earth.

SOIL IMPROVEMENT THE KEYNOTE OF AGRICULTURE.

By R. S. SEEDS, *Birmingham, Pa.*

The bell, in ancient times, was to the people about as important as the steam whistle is to-day, and in casting the bell the most important feature in its construction was the keynote. The keynote to the bell is as essential as soil improvement to agriculture. This seems to be more apparent every year. I notice at the Fifth Annual Round-Up of the Michigan State Farmers' Institute at Ann Arbor, February 27, 1900, the programme was:

1. The Soil from a Chemical Standpoint.
2. The Soil, as a Bacteriologist Sees It.
3. Maintaining Fertility with Green Manures.
4. Soil Physics. Moisture Most Important.

This is and ought to be the paramount question of the farmer, and I have somewhat changed my mind on the subject. I said last year, at Bloomsburg, that the first and most important thing for the farmer was fertility; the second, the home, and third, education. I now think there are twenty things very essential for the farmer. One is the home, one is education, and the other eighteen are the improvement of the soil.

I would have preferred to talk on some other subject on this occasion, for it seems to me I hear every man say in his mind, "Well, here is Seeds with his hobby again." But, being requested to speak on this subject, I expect you to take your medicine willingly.

For years I have noticed the land in Pennsylvania go down in productiveness, and crops grow smaller every year. Many crops freeze out in the winter or dry out in the summer time. Neither wheat or grass grow as large as they did in my grandfather's days,

and the farmer has looked for something to brace up his land and help him through, many turning to lime and commercial fertilizers, and many to their sorrow. Commercial fertilizer would never have been made had there not been a demand for it. If the farmer's soil had been satisfactory he would have no use for it. The humus and vegetable matter have been worked out until much of the soil has been almost ruined. If this be the case, and true, then the most important subject is soil improvement.

I have heard for years, that we can raise anything if we have lots of water. This is true, and when you consider that soil filled with vegetable matter (compared with soil that has not been worked out), contains as high as 50 tons more water to the acre, can you imagine the value of this when you are raising in a dry season, corn and potatoes that are 70 to 80 per cent. water.

I have watched the power of this kind of soil along side of land that had been skimmed, and you could see the blue milk soil starve the plants almost to death. In watching the action of such soils, I often thought of Dr. Rothrock's pictures and description of streams drying up as the forests have been cut and the vegetable matter on the earth's surface burned up by forest fires, and as the ax and forest fires rob the earth of water supply, so does the plow and binder rob the soil of humus, vegetable matter and water holding power. While many have laughed at me, with my vegetable matter hobby, I have watched with pleasure the rapid improvement in my soil year after year until I can look with pleasure on as fine clover and grain as stands in Huntingdon county.

The last winter was very severe on clover and wheat, many wheat fields being plowed up and millet being sowed to get hay in this part of the State, and many of my neighbors are complaining, while my wheat is good and my clover is as fine as any I see this year, on land that seven years ago was covered with daisy, sorrel, golden-rod and briers. I do not think you can find a weed in the field today. This is all due to plowing down vegetable matter. At Bloomsburg, last June, I overheard some men saying, I could not get fertility and improve my soil with vegetable matter for less than one dollar an acre. I now make the assertion that I am going to get the cost down to 60 cents an acre this year.

Since last June Round-up I plowed down cowhorn turnips and crimson clover, commencing to turn them under November 21, and put the field in oats this spring. I went to Chester county May 26, 1900, to attend a Farmers' Institute and I did not see a better field of oats on my way down or back, and this field had nothing but the vegetable matter, and seven years ago the field was so poor it would not raise anything. On the 18th of May, I was spreading manure on a hill above the oats field and looking on the oats field

it had the appearance of a dappled gray horse, only the spots were as regular as if you had laid the spots off with a tape line or measure of some kind. I was puzzled to know the cause and at last came to the conclusion that the spots were where the corn shocks had stood. Now, what was the cause? I put on my thinking cap and ere long came to the conclusion that the corn shocks stopped the growth of the crimson clover and cowhorn turnips and started them to decay sooner than the rest that grew on till November 21. The vegetable matter on these spots was decayed and available plant food before the rest and showed up in the oats. You could see them as plainly as you could see the field; it was during the dry weather and you could not only see the difference in the oats, but could walk to the spots and see a difference in the color of the ground. On this field I plowed down near \$20.00 worth of fertility to the acre that cost me less than \$1.00. In addition to this cost, I produced nearly all this fertility or vegetable matter on either side of the soil I cultivate. I mean from the subsoil and air.

On the sixth of last August I took with me to a Perry County Farmers' Institute, crimson clover plants 7 inches long and cowhorn turnip plants 9 inches long, and laid them on my rule before about two thousand people. (Deputy Secretary A. L. Martin saw me do it.) Four weeks after I had sown the seed I was producing the plants from the subsoil and air. They used to laugh at me for talking this way; they do not laugh any more; they have raised the valuation of my farm from \$15.00 per acre to \$40.00. They laughed at me for mowing my young clover in the fall to make it stout, and the old clover to keep it from going to seed, and many in the Juniata valley who laughed at me will not be bothered this fall cutting their old clover for seed or to keep it from going to seed; all this hinges on holding to vegetable matter for soil improvement.

I believe I can farm a field forty years in succession with the help of vegetable matter and have it better then than when I commenced. You can not do it with lime or commercial fertilizers. They used to farm land in the west for years in succession and burn the straw, but they are going to quit. They have been farming land in Pennsylvania for years and leaving the dollars run through the barn-yard fence, but they are going to stop it. I am nearly through building a straw shed to my barn, covering the barnyard, and boarding it up, making it warmer than my stables have ever been. I am trying to get in position to manufacture fertility and keep it from getting away from me. I can not see the use of buying fertility and letting that which we already have run away. I am going to start a fertilizer factory at my barn and produce stock as a by-product. I hope to be able to raise a three year-old steer in 24 months. If I can keep

him warm in winter and from getting hungry and thirsty I believe I can do it. If I can, I get rid of a year's work, and if I sell \$100 worth of steer twelve months sooner I gain \$6.00 in interest, besides that, my fertility is much better than when I take 36 months to produce a three year-old steer. This is a point in figuring soil improvement.

I was talking along this line at a local farmers' meeting some time ago, and after the meeting a farmer came to me and said he had a shed where part of the barn manure was kept and the balance went into the barnyard, and when put on the land he could see that one load from the shed was worth three loads from the yard. On my way to Chester county week before last, I saw from the car window beautiful farms, with grand buildings, in good repair, fences white-washed and everything clean and neat as a new pin. Many had gone to the trouble and expense of putting a nice stone wall (not a fence) with a shingle roof on it, around their barnyards, and I could see the colored manure water coming through the wall and running down along the roadside in a neat little ditch made for that purpose. The day will come when this will be a thing of the past. You could see the crops in the fields needed that fertility; the farm needed it for the improvement of the soil.

This is one of the mistakes of life that has a price to it. Another mistake of life is raising 100 bushels of wheat for \$65.00, and leaving \$100.00 worth of that which improves the soil run out of the barnyard and leak away. Taking care of the barnyard manure, the fertility we have, applying it on grass as soon as possible after the manure is made, always spreading it as hauled out, getting vegetable matter as cheaply as possible to plow down, and holding on to, and using our red clover before it gets away from us, is, in my opinion, the milk in the cocoanut, the keynote of soil improvement.

MANAGEMENT OF DAIRY COWS ON THE FARM.

By L. W. LIGHTY, *East Berlin, Pa.*

THE MAN.

The first factor of success is the man or manager; hence no profit can be made on a farm with dairy cows unless the man is a lover of

the dairy cow. If you are a lover of that sleek, fat cow, I suggest do not try your hand at dairying; better invest in race horses or breed bulldogs, for she will eat you out of house and home if you want to transpose her into a dairy cow. I repeat that it will not pay to keep a 150 pound butter cow, but still I have the best of reasons to believe that the average cow of Pennsylvania falls below 150 pounds of butter per year. The man who is not willing to sacrifice his liberty to the cow, to attend, yes, attend personally to her every want and do it cheerfully and pleasantly had better devote his time and land to some other line or specialty. (Our National Department speaks highly of goat and skunk farming. This is a mere suggestion as an outlet for some would-be but very unsuccessful dairymen). If a man needs a few bad dogs (good dogs are dead dogs), and a few worse boys to drive his cows to and fro, I am in serious doubt if his special forte is dairying. If a man, for conscience sake, or any other constitutional reason, wishes to avoid all labor on every holiday, legal or otherwise, noted and unnoted in the calendar, that man wants to let dairying alone. The dairy cow wants to be fed and watered every twelve hours, and milked about that often, and that means 730 times a year; and the man who is born tired will never make a good dairyman.

THE COW.

The next factor in the problem is the cow, possibly it is the biggest factor. Not long ago a party remarked to me, "Lighty, any fool could make money with cows that produce as much butter as yours do." I could not tell if that was a right or left-handed compliment. One of the greatest stumbling blocks for the would-be dairy farmers of our country is the general purpose, and all-purpose cow combined. They say, we will hit two birds with one shot, and shoot over the whole tree; then exclaim, "Do you see those feathers fly?" Yes; they fly; and so do the birds. To make a long story short, the dairy cow is one that has been trained from her youth up, has inherited from many former generations the special power and capacity to transform a large amount of cheap roughage grown on the farm into good milk; in other words, she produces the maximum quantity of good milk at the minimum cost to the dairyman. Find me a cow that eats a large quantity of hay, silage, stover, etc., with an appropriate proportion of grain, and then gives 40 to 60 pounds of milk daily for 300 or more days in the year, and I will show you every time a cow of a special type, a type built on dairy lines and a cow that will not produce beef profitably, nor will her progeny. These types, the dairy and beef, have been discussed so fully and so frequently that I will not weary you with a repetition. Dairying with your beef bred cows is and must of necessity be a losing busi-

ness. You can save the purchase money of a hay rake by raking your hay with the springtooth harrow. So you can also do your dairying with your beef bred animals, and the one will be as much of a financial success as the other.

THE SHELTER.

In our varied climate, with its wide extremes of temperature, shelter for our cows is quite an item of expense; and we must even do considerable thinking at times to keep our cows comfortable at all seasons. If you are watchful you will soon notice that as the degree of discomfort increases the profit decreases. In winter we need a warm, well ventilated, well lighted stable (let us call it a cow-house), and in summer a protection from the heat and flies. At the same time this cow-house should be so arranged as to be quite convenient for the feeder and milker. Prof. Roberts in his recent excellent work "The Farmstead," illustrates quite graphically how with scattered and inconvenient farm buildings the profits of the farm may be absorbed by the labor involved in doing chores.

In constructing a shelter for our dairy cows there are a number of important considerations. We want to keep the cows comfortable, healthy and perfectly clean. We want to get the feed to the cows with the least possible work. We want to draw the milk with the least possible contamination. We want to save all the manure. I do not wish to consume time in amplifying these topics, but if you will allow, Mr. Chairman, I wish to state that in my experience I found more good health was poured into my cow-house through a half dozen windows, 2x3 feet, during a sunshiny wintery day than was contained in a half ton of condition powders.

FEEDING.

It keeps the average cow hustling on an average pasture field in the midsummer sun to feed all the flies that swarm on her the whole day long, without giving a thought to secreting milk. It is not advisable to try to develop working oxen out of our dairy cows. To have them do their best, we should bring the food to the cow, instead of sending her out to hunt it up. The pasture as it often is when we turn the cow in is the ideal, but very soon it becomes otherwise. In yonder lot clover is abundant and in full bloom; in one corner flows a sparkling brook of the best clear water, shaded with a clump of trees and undergrowth. Here is an almost ideal condition for our cow. She can fill herself with clover by taking but a few steps, and then drink all the water she wants and use the balance of her time in digesting and assimilating her food and in manufacturing the product for which we keep her.

What have we here? First, we have the best succulent feed.

Second, we have it so plenty and convenient that the cow need not expend undue energy to secure her daily feed. Third, we have a balanced ration. Fourth, the cow need not consult us as to when and how much she shall drink. Fifth, the cow is perfectly comfortable. Just at this time nature brings about these ideal conditions, but they are very short lived. Nature study occupies considerable of our attention just now, and I want to say to my fellow dairymen that nature will teach us very much more if we only become her pupils; then it teaches our city boys who race over our fields and meadows in quest of butterflies, bugs and caterpillars. All we need to do is as nature teaches us in the fore part of the month of June. Put that cow into June conditions the whole year.

Do not say it cannot be done, because it can, my friends. If we will only use the brains the good Lord has given us with some purpose. We can give that cow good, succulent feed the year through. We can always place it so she need not exert herself more than she must in yonder lot where clover is very abundant. We can, all of us, with the greatest ease calculate a balanced ration and compound it from our available feeds. We can easily have an abundant supply of the best water convenient. We can make our cow perfectly comfortable.

These are the conditions and they can be supplied on almost every farm, and by any farmer who is a lover of the dairy cow.

PAPERS SELECTED FROM THOSE READ

AT

FARMERS' INSTITUTES

DURING THE

SEASON OF 1899-1900.



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FARM FENCES AND WAYS OVER THE FARM.

By HON. G. W. HOOD, *Indiana, Pa.*

It is a fundamental principle of our law, that every man must keep his cattle on his own land, and, if they stray away into other people's grounds, he is liable for any damage they may cause by the trespass.

At common law, it was necessary that every man should keep a constant watch over his animals, or, if he did not do this, to surround his land with a fence.

The first and primary object of the fence, was to keep his own animals in, and *not* to keep other people's out; and if any land-owner kept cattle, he was bound to erect a fence around his entire close, whether his neighbor kept any cattle or not; but, of course, the same rule applied to his neighbor, because if he kept any he must surround his farm with a fence also.

But it was discovered that two parallel fences would be useless, and be attended with very considerable expense, and as one and the same fence would answer for adjoining proprietors, it was provided by statute, March 11, 1842, "that when any persons shall improve lands adjacent to each other, or when any person shall enclose any lands adjoining another's land already fenced in, so that any part of the first person's fence becomes the partition fence between them, in both these cases, the charge of such division fence, so far as is enclosed on both sides, shall be equally borne and maintained by both parties."

By the same act, the auditors of the respective townships were made fence viewers, whose duty it was, within four days after notice given, to view and examine any line fences, and to make out a certificate in writing, setting forth whether, in their opinion, the fence of one which has been already built is sufficient, and, if not, what pro-

portion of the expense of building a new or repairing the old fence should be borne by each party; and they should set forth the sum, if any, which, in their judgment, either one ought to pay to the other, in case he should neglect or refuse to repair or build his proportion of the fence—a copy of which certificate it was their duty to deliver to each of the parties; and if any of the parties refused or failed, within ten days after copy of the certificate of the viewers had been delivered to him, to proceed to repair or build the fence as required, the party aggrieved had a right to build the fence, and bring suit against the delinquent party for value of the same, before any justice of the peace, or alderman, and recover as in action for work, labor, service rendered, and materials found.

It follows, therefore, that if any adjoining owner does not keep up his half of the partition fence, and my cattle get through and injure his crop, he has no redress against me, since his own neglect was, in part at least, the cause of his injury.

But at common law, if my cattle escape through my neighbor's defective fence, and stray upon the lands of another, and there injure his crop, I am liable in damages to him, though my own half of the fence is good, because, so far as third persons are concerned, I am bound to keep my cattle on my own land; and if I have any redress at all, it is against my neighbor who failed to keep up his part of the partition fence. At common law, also, if I turn my cattle into the road, and they wander upon the lands of another, or if some careless person, crossing my farm on a hunting or fishing excursion, leave down my bars, and my cattle escape into the highway, and thence into my neighbor's grain field, I am liable to him for damages they may cause. On the other hand, if you are driving your cattle along the road, and, without any fault of yours, they run upon the land of another, and you drive them out as soon as you can, you are not responsible for the damage done, because you had a right to drive them along the highway, and if you exercised proper care and attention, you could do no more. The law recognizes a difference between being lawfully and unlawfully on the highway.

The common law, is, as I have stated, that every man is bound to keep his cattle on his own land; and this is the rule in this State, unless the acts of Assembly impose duties upon land owners other than those of the English common law. Under the provision of the act of 1700, which has recently been repealed, the owner of cattle was held liable for all damages caused to the owner of enclosed land, if he fenced according to law; and it has been held under that act that unless improved lands are enclosed by a fence, the owner is in default, and cannot maintain trespass for damage by roving cattle; and the owner of improved lands must fence them, both to restrain

his own cattle and to shut out the roving cattle of his neighbor. This is the doctrine laid down in the celebrated case of *Gregg vs. Gregg* reported in 55 Penna. State 227, but would not be the law to-day.

If adjoining land owners agree not to make any common division fence, each is liable to the other for the trespass of his cattle. But where a division fence has stood for twenty-one years, one of the owners cannot remove it without the consent of the other; neither has he any ownership in the material of the part erected by himself; and where one party unlawfully removes a portion of a partition fence, and sets it upon his own ground, this does not authorize the owner to fence up to it, on his neighbor's land. Neither can one of the owners of adjacent unimproved land call upon the other to contribute to the charge of a division fence.

The duty to maintain partition fences exists only where both parties improve their lands. It would certainly not be just to make a man, whose lands is in woods and not improved, and on which he raises no crops, to pay expenses of maintaining and building a fence which can be of no possible benefit to him. Hence the policy of this law to compel those only who are benefited by the fence, to either build it or be liable for delinquency in not building it.

Aside from this, however, no man is compelled to build or keep in repair a partition fence on the line between him and his neighbor. If he prefers, he can have his own fence; but he must put it on his own grounds, and maintain and keep it in repair at his own expense, and if cattle break through his close and enter upon the lands of another, he is liable; so, on the other hand, his neighbor can have his own fence also; but he, too, must build on his own ground, and will alike be liable in damages if his animals break over his close.

If a division line between two farms passes through a wood lot, neither of the owners is obliged to erect a fence; but if either owner allows his cattle to pasture in the woods, he must not let them pass the boundaries of his own land, or he will be responsible.

As to fences along the line of railroads, the law is somewhat different. A railroad company is not bound to fence its road, and is not liable to owners of stray cattle killed thereon. Neither is a railroad company liable for the value of cattle killed on its track, though they escaped from a properly fenced enclosure without the knowledge of the owner, and were killed at an intersection with a public highway. And where a railroad company, in purchasing the right of way, binds itself to fence the road through the other party's land, but neglects to do so, if the cattle of the latter stray upon the track, and are killed, the owner cannot recover for the injury in an action of tort. Railroad companies are not bound to pay for losses incurred by actual negligence; and if cattle unlawfully

stray upon their track, and are killed, the owner must suffer the consequences, because he should have kept his cattle on his own lot, and not allowed them to stray on others' lands.

WAYS OVER THE FARM.

A way over the farm may be granted on a special permission, as when the owner of the land grants to another the liberty of passing over his grounds to go to church, to market, to mill, or the like, in which case the gift or grant is particular, and is confined to the grantee alone. It dies with the person, and if the grantee leave the country he cannot assign over his right to another.

A way may be also by prescription, as if all the inhabitants of a certain town or village, or the owner or occupiers of a farm, have immemorially used to cross such a ground for a particular purpose; for the immemorial usage presupposes an original grant, whereby a right of way may clearly be created. Prescription rests upon the presumption of a grant, but to authorize such a presumption, the user must be adverse, and under a claim of right.

The period of twenty years has been adopted in England, in analogy to the statute of limitations in relation to land, which bars an entry after twenty years adverse possession. In Pennsylvania the period of limitation is twenty-one years and the same period has been adopted to give rise to the presumption. So where a way has originally existed, it may be a rebutted evidence of non-user for the same period, which gives rise to a presumption of extinguishment; but where it has been acquired expressly by grant or reservation, it will not be lost by non-user, unless there was a denial of the title or other act on the adverse part to quicken the owner in the assertion of his right.

Twenty-one years actual occupation of land, adverse to the right of way, and inconsistent with it, bars the right; but it must not be understood that a man acquires a right of way over the lands of another, in twenty-one years, to such an extent, and with such a liberty, as to wander over the farm just where he has a mind to, and just where his pleasure and convenience suits him. No man can gain such a right, because that would be an intolerable nuisance to the farmer.

To gain the right by twenty-one years use, he must have actually used the identical and particular way, or road, under a claim of right to do so, and not with your consent or permission. It is not necessary that any one owner should have used it twenty-one years; if successive owners have unitedly used it for that period of time, it would be sufficient as far as time is concerned. But if this prescriptive right of way was gained only by using it for some particular purpose, as for hauling wood or timber from a woodlot beyond, that

would not authorize the person to continue to use it for all purposes after the wood had been taken off.

A right of way may also arise by act and operation of law. For, if a man grants me a piece of ground in the middle of his field, he at the same time tacitly and impliedly gives me a way to come to it, and I may cross his land for that purpose and not be a trespasser; for when the law giveth anything to one, it giveth impliedly whatsoever is necessary for enjoying the same.

By the law of the Twelve Tables at Rome, when a man had the right of way over another's land, and the road was out of repair, he who had the right of way might go over any part of the land he pleased, which was the established rule in public, as well as in private ways; and the law of England, in both cases, seems to correspond with the Romans.

The ways, of which we have been speaking latterly, are termed "ways of necessity," and are always strict "necessity."

The necessity must not be created by the party claiming the right of way. It never exists where a man can get to his property through his own land, and it will be to no purpose for him to set up the plea that a road through his neighbor's land would be a better one, more convenient, or less expensive; neither will it do for him to claim that a road through his own land would be too steep or too narrow, as the case might be. It is only where there is no way through his own land, that his right of way over the land of another exists, and a right of way, of necessity, extends only to a single way.

But, whereabouts shall be the way? The owner of the land over which it exists, has a right to locate it in the first instance, with this limitation, that it must be a convenient way. If he fails or refuses to locate, or makes an inconvenient way, or unreasonable location, the right devolves upon the grantee of the way.

The right of way, of necessity, ceases with the necessity which gave rise to it; so that if a public road is opened, or the grantee purchases other lands which give him a way, or it becomes suddenly impassable by natural causes, such as the overflowing of a stream, or the falling of trees in a storm, he would have a right to deviate to oneside until the stream would fall, or he had an opportunity to remove the obstruction.

All these rights of way are liable to become nuisances to the farmer, and may frequently lead to litigation, and it is important to know that it matters not in what manner a right of way is acquired over your land, you have the right, in the absence of any stipulation to the contrary, to erect suitable gates or bars at the entrance thereto from the highway; and if another party leave them open,

and cattle get in and yours get out, he is liable to you for the damage which ensues.

In Pennsylvania, the manner of procedure to obtain private ways is provided for by act of the Legislature, approved June 13, 1836, by the provision of which act the several courts of quarter sessions have power, in open court, upon the petition of one or more persons for a road from their respective dwellings, or plantations, to a highway, or a place of necessary public resort, or to any private way leading to a highway, to direct a view to be had of the place where such a road is requested, and report thereof to be made at the next ensuing term of court.

If it shall appear to the court ordering the view, by the report of viewers, that such road is necessary, the said court shall fix the width of the road, and direct it to be opened accordingly, and the proceedings in such cases shall be entered on record; and from thenceforth such road shall be deemed and taken to be a lawful private road.

All private roads shall be opened, fenced, and kept in repair by and at the expense of the person or persons respectively, at whose request the same was granted or laid out, and by their heirs and assigns. The damages sustained by the owner of the land through which any private road may pass, shall be estimated in the manner provided in the case of a public road, and shall be paid by the person at whose request the road was granted or laid out, but no road can be opened until the damages are paid.

The expense of the view of a private road, as well as the expense of the view to assess damages sustained by the owners of the land taken, must be paid by the person or persons applying for the road.

HYGIENE ON THE FARM.

By IDA M. DICKINSHIED, *Hosensack, Pa.*

Hygiene is the art of preserving health; that is, of obtaining the most perfect action of body and mind during as long a time as is allotted to each one of us. In other words, it aims to make growth more perfect, decay less rapid, life more vigorous, and death more remote.

Our bodies are like a house that can be rented for a term of years under the most reasonable conditions. All that is asked of us in return is that the premises should be kept in good repair. Surely the terms are not hard, not difficult to comply with, but light and easy as they are, the penalties attached to non-fulfillment are heavy.

Disease never occurs until the laws of health have been broken somewhere, either by violation of personal or public hygiene. Very often we cannot follow the rules we should, however much we may desire to do so. For instance, pure air is an absolute necessity for health, but we may have little or no control over the air which surrounds us and which we must draw into our lungs. We may be powerless to prevent other persons from contaminating the air, thereby striking at the very foundation of health and happiness.

A supply of pure water in sufficient quantity is a sanitary necessity. Without it injury to health inevitably arises, either from too small a quantity or more frequently from the presence of impurities. The germs of typhoid fever often lurk in apparently the purest springs and wells. The water itself is pure, but is contaminated by the surroundings, drainage from the barn yard, chicken coops, other outbuildings, and pools of stagnant water find their way into the springs and wells. This has been proved by putting salt in suspicious places; in a short time the salt was detected in the water of the well or spring.

It is seldom we see any provision made to carry off the household waste water. Too often all the cleansing and the family washing is done near or at the water supply, and nothing provided to carry off the waste water; the man of the house should make provision for this, and he little thinks, perhaps does not know, that by utilizing the waste water it can be made a source of considerable profit. Grape vines and trees respond readily to a dose of soap suds. How much better to nourish your trees and vines than to cause ill health and disease by contaminated water.

The carrying off of rain water so as not to sink into the ground too near the house is a matter of great importance. There should be a hundred feet or more from any avoidable or unavoidable nuisance to the water supply. It is impossible to over estimate the importance of pure water for the welfare and comfort of man. For the preservation of a proper degree of cleanliness of our bodies, our clothing, our dwellings or the articles with which we have to come in contact, it is indispensable.

Farm houses are not always built on hygienic principles, but it lies within our power to remedy many of the defects causing us to have impure air from improper drainage. As the air of the cellar, is, so will the air of the house be. A cellar should be well ventilated and made as dry as possible, and daylight and sunlight allowed to

come in. The living rooms should be thoroughly ventilated and well treated. We should not keep out all the fresh air and try to delude ourselves with the idea that it requires more coal and wood to make the room comfortable again. Many are ignorant of the fact that it requires more heat to warm impure air than to warm pure air. Open the doors and windows, if only for a few moments, and have fresh air to breathe instead of breathing over and over again the same air. Sleeping rooms and beds require daily ventilation. This is a matter of importance we should never neglect. Pure, fresh air is a blessing we should not banish from our homes.

Great care should be taken in the selection of our food—the quality and quantity. Aiming to select such foods as are nourishing and digestible, then have them well cooked and well baked. We cannot have fixed rules for diet. Every man should be his own judge as to what and how much he should eat. He must, however, bear in mind that the amount of food and exercise must be balanced. Great mental and physical work can be borne well if hygienic principles of diet, exercise, etc., be attended to. Milk has so often been the carrier of contagion that everything which in any way could affect it should be carefully examined. In order to do so we must begin at the barn, and if I am allowed to suggest a few words to the other side of the house, would say, keep the barn, the surroundings, and above all, the cow stables, as clean as possible. Animals as well as man must have pure air and clean surroundings. Next comes the dairy. The milk cans and even the water they are washed in should receive attention.

Were the laws of health and physiology better understood, more sought after, how great would be the effect. It would almost change the face of the earth. Let us hope that matters of such great moment may not always be considered of less importance than the languages of extinct nations, or the unimportant facts of dead history.

NATURE STUDY.

By MISS MARY SHEARER, *Saxton, Pa.*

Unlike most school subjects, nature study has not been reduced to a conventional form—the same for every town and every school.

Nature rings endless changes upon herself; she has her seashore,

her rural, her mountain aspects; her moods for summer and for winter and the shifting times between. For every change of place or date there is a new dress from her infinite wardrobe. To compass nature is not to be thought of. The vastness of her field forbids and the hopelessness of the task is a blessed feature of the study. This is one study, at least, where mere acquisition may be thrown to the winds and one study where the higher aim—that of keeping the child in an ever enlarging sense with the world that excites his wonder is not so easily missed. It will be a sad day, not only for the child, but for the adult, if this delightful wonder ever relapses into indifference.

Nature is a theme on which the child may try his tools; it gives him something to talk, write, read or think about; something to count, measure, weigh, draw, watch or otherwise to test; something to draw him out and tax him on all sides. How finely the study fits into the spirit and aptitude of the unspoiled child, widening his mind as it widens its horizon, and kindling his soul as it opens up new prospects to his delighted vision; capital foundations in awakened interest and a longing for more may be laid for the later years when nature is more clearly seen. The world is a great picture book. Whenever we walk or ride over its surface we see the picture stories on its stones and leaves. We see the grand procession of its seasons, the winds, the storms, heat and cold, sunlight and shadow, and we read in the rocks the history of the world.

The most important object of nature study is not the acquisition of a knowledge of plants, animals, etc., but it is to interest pupils in nature and to cultivate in their hearts a love for it. The second aim is to train the pupil to observe, express and compare (see, tell and reason), to form the habits of a careful investigation and clear and accurate statement, and to develop in him a taste for the beautiful. Last comes the acquisition of knowledge. For the attainment of any of these objects, interest, power, or knowledge each pupil must study the object itself. A book should not be used by the pupil, and the teacher should simply interest and guide the pupil in his work. The pupil should get his facts from the objects (plants, animals or whatever it may be he is studying), and not from the teacher. The examination of the objects rather than the words of the teacher should impress on the minds of the pupil the ethical truths.

Observation is of little value unless its results are expressed by the pupil. The forms of expression are: Motion, stitching, modeling, drawing, painting, making and oral and written language. For the children in the kindergarten and primary grades, motion, stitching, modeling, drawing and painting are often more expressive than language. Language, the most universal method of communicating

ideas, must be emphasized in all but the earliest years of the course. The clearest and most exact way of expressing form, position and relation is by drawing.

Often the simplest and quickest way to give pupils clear, sharp ideas about the objects they are studying is to have them draw objects before reducing observations to writing. Drawing gives better ideas of form and relation than can be obtained from a word description.

Nature study will not succeed unless it is co-ordinated with other studies. It should not and must not be pushed in as an extra, but must be made the basis of much of the other work of the school. Experience shows that when used in connection with language and drawing it gives to these subjects a life and interest they never before possessed. The study of nature forms a fitting introduction to much of the most beautiful in literature. The opportunities for connecting such work with geography are numberless. Through it even arithmetic may have a new life infused into it.

There are so many subjects in which the child must be tested, not so much by standards within him, by which alone he can be fairly judged as a child but as by standards without of arbitrary marking and based on notions of scholarship. In these he must be held to account from the start. But in nature study it is not so, at least on its culture side—his free spirit should go untethered a longer time. Of course his scientific house must be founded on a rock or the floods will sweep it away, but tests of scholarly attainment need not come till physics, chemistry or botany emerge as a separate study.

Nature study is winning the schools and the children, but with all the gain that it is making, there is still many a teacher who moves along in the old narrow ruts as if the highway that leads up to her school room door never knew such a thing as the chipmunk's hide-and-seek in the wall that borders it or the call of the musical wood thrush from the thicket hard by.

"Whether we look, or whether we listen,
We hear life murmur, or see it glisten.
Every clod feels a stir of might,
An instinct within that reaches and towers,
And, grasping blindly above it for light,
Climbs to a soul in the grass and the flowers."

THE BIRDS AND THE FARMERS.

By HARVEY CLARK, *Mann's Choice.*

When nature is undisturbed there is kept up a balance between plant and insect life mainly by birds, which constitute nature's great check upon the excessive increase of insects. By the process of agriculture man brings together in one area great quantities of certain plants which he uses for food, and in this way furnishes abundant food for certain insects, which often seriously affect the profits of these crops. Thus, we largely lose the balance which nature would maintain, and some means should be taken to increase the number of birds; whereas, on the contrary, the tendency of man's operations has been to destroy the birds, and in that way we can account for the immense damage every now and then by great myriads of noxious insects. The actual benefit birds render to man in destroying insects of all sorts cannot be fixed. It is roughly estimated that there are about ten times as many species of insects in the world as there are species of all other kinds of animals combined—mammals, birds, reptiles, shell-fish, and all the various forms of life. Some writers estimate that the number is twice as great as this—twenty times as many insects as all other forms of animal life. Now, of the aphides (plant lice), one during our ordinary summer, will become the progenitor of 13 generations from the opening of spring until the winter kills them off again; and as a rule, there are 100 young in a brood.

As to the amount of vegetable matter insects consume, it is calculated that an ordinary caterpillar will increase in 30 days from the time it hatches from the egg, about 10,000 times its own size.

If the increase of the human body during a natural lifetime were in the same ratio as the caterpillar's, man would at the age of maturity weigh 40 tons. This gives an idea of the enormous rate of growth of caterpillars, and, proportionately, the enormous amount of food which they consume. It has been estimated that about 10,000 caterpillars could very easily destroy every blade of grass in an acre of cultivate ground. Look at the ravages of potato bugs, army worms, and grasshoppers in the west. They destroy the vegetable matter over wide areas.

It has been calculated that there are about 700 to 1,000 individual birds to be found in every square mile of rural district. Suppose each bird consumes about 50 insects during the day (a very moderate estimate, because parent birds visiting their young do so a hundred times a day, and each time bring an insect or some article of food, according to the nature of the bird); at this rate of figuring, 750 birds to a square mile, with 50 insects per bird per day—in the State of Pennsylvania in a day there will be consumed one billion seven hundred and sixty millions insects; or, in the course of six months, 316,800,000,000 insects. Though probably a very moderate estimate, this will afford some idea of the immense benefit man derives from birds agriculturally. Many birds considered injurious to man will, on careful examination, tell a different story. The common crow—blackbird, common in this vicinity, arrives from its winter grounds in numbers about the first of March, gradually increasing in numbers, and occurring all through the Middle, New England and Southern States. This bird has a bad name among the farmers, because it pulls up the seed corn, and later on feeds on the mature corn, and to a certain extent on fruits. Therefore the farmers everywhere are down on the blackbirds. Some years ago, however, a Government Bureau in Washington, D. C., was directed to investigate the food habits of birds; and an immense number of bird stomachs were secured and then bottled in alcohol and studied under the microscope, and the proportion of animal and vegetable material, also the exact species of plants and insects that were contained, in a great many cases has been ascertained. It was found in the case of the blackbird that fully one-half of its food consisted of insects. In the case of the young blackbirds, they for several weeks are fed entirely on insects. The digestive organs of the young blackbird do not develop the heavy, thick coating of the adult blackbird for quite a time, and it would be impossible to digest corn and wheat until it becomes almost an adult bird. The first food of the young blackbird is almost invariably spiders, then larger soft insects, finally, the several kinds of beetles. Hawks and owls have been badly misjudged. Farmers shoot them on sight, because they do a great amount of mischief. Investigation by the Department of Agriculture shows that out of 73 species of hawks and owls in the United States, there are only five really injurious to agriculture. In all the others the proportion of noxious insects in their food is very much in excess of a lot of our common hawks, there were 2,212 stomachs examined, and these contained in their food supply 56 per cent. of field mice (very injurious to all sorts of crops), 27 per cent of noxious insects, and $3\frac{1}{2}$ per cent. consisted of poultry. The chicken hawk is a great friend, instead of an enemy, to the farmer, rarely carrying off any chickens, but feeding almost exclusively on field mice

and grasshoppers. In an examination of 562 stomachs of chicken hawks, 278 contained field mice; 171 others, small mammals; 47 noxious insects, and 54 poultry. The actual contents of the 562 stomachs consisted of the remains of 40 small birds, 12 chickens, 52 mice, and several thousand insects. This shows that for every chicken taken there were 50 mice, and probably as many as 1,000 or 2,000 insects, which considerably more than offsets the loss of a single chicken to the farmer. Notwithstanding the favorable showing, laws have been continually passed in Pennsylvania offering bounties for the slaughter of hawks and owls. Furthermore, the heads and scalps of other small birds which are not hawks or owls at all, such as whip-poor-wills, night-hawks, and other such birds, are brought into our county authorities, who are a good deal more politicians than ornithologists.

These laws are still in force in some States, and in very few is there any law protecting hawks and owls. The United States Department of Agriculture has circulated thousands and thousands of the reports from which I have given you some extracts, yet they seem to have no effect upon farmers at large. The Legislature of Pennsylvania passed a law some years ago protecting hawks and owls. It was in operation for one session. In the next a bill was introduced legalizing the killing of hawks and owls, showing the impossibility, almost, of keeping laws of this kind in force in the face of the popular prejudice. Some birds indisputably destroy considerable quantities of ripened grain, fruits and berries, such as the red-winged blackbird. Crows undoubtedly destroy a great deal of grain; but in the case of the blackbird, he does quite as much good as harm. The Baltimore oriole destroys considerable quantities of grapes in certain sections, but he is very largely an insectivorous bird at other times, when he subsists almost exclusively on insects. While the red-headed woodpecker feeds in summer almost entirely on insects, during certain seasons he does considerable damage to raspberry and blackberry crops. The robin, king birds, meadow larks, cedar birds, thrushes, cat birds, and sparrows are, during part of the year, very injurious; but as a rule there are very few of these birds but that amply make up for the damages to the crops by the insects they destroy at other times of the year.

In conclusion, I say, every farmer should use his influence to protect the birds.

SOME SUGGESTIONS FOR FURNISHING AND DECORATING COUNTRY HOMES.

By LAURA M. DICKIE, *Homer City, Pa.*

In a western town there is situated a college for young men and women in which appears this significant motto: "The honor of a house is hospitality; the blessing of a house is piety; the happiness of a house is contentedness; the ornament of a house is cleanliness." With this ornament lacking it will not be the abode of health and comfort.

Then the first consideration of the home should be in regard to its healthfulness. This is maintained when the household is kept at its best. That "order is heaven's first law" has passed into a proverb, and order embraces fitness, arrangements, simplicity, and above all, neatness. It should begin with the cellar and end with the attic.

Every farmers' house should have a good cellar—one that will withstand the cold of winter and the heat of summer. There should be an outside doorway and also an entrance from the kitchen.

Now, we pass to the kitchen. Here we should find a good range, a table and chairs, a sink placed underneath pipes that carry the water into the kitchen, a cupboard well supplied with cooking utensils, and on the floor a good rag carpet.

Off from the kitchen should be a pantry containing flour bins, shelving for canned fruit, etc., and a cupboard for aprons and tea-towels.

Every farmer's house should have a dining room. This should be an airy room—one that can be kept cool in summer and clear of annoying flies. This room does not require a great deal of furniture, but what there is should be of the most substantial kind. It may contain in addition to table and chairs, a china closet and side-board.

Whether a hard wood floor should be bare or carpeted is a question on which housekeepers do not agree. The cleanliness of the bare floor is an argument in its favor, but many prefer carpet as it deadens the sound of footsteps.

The living room or sitting room, as it is commonly called, should be the most attractive place in the house. All the furnishings

should be of the most substantial and comfortable kind, with nothing too good for use, and nothing that will be harmed by exposure to sun and light. In this room there should be a large table, a couch, a book case, good lights and comfortable, easy chairs.

In the parlor, especially, one might be tempted to be extravagant, although a nice, neat parlor can be furnished without containing upholstered furniture. Here could be found comfortable chairs, a sofa well supplied with pillows, a stand or table on which is a lamp, a brussels carpet and some rugs on the floor, and an organ in one corner, or, if the purse will permit, a piano instead.

The bedrooms should be well lighted and well ventilated. Each one should be furnished with a comfortable bed, a dressing case which should be as generous as possible in drawers and mirror, a washstand, a towel rack, a toilet set, one easy chair and one plain one, a small table, and a rug. If means would permit, a couch, a writing desk and book shelves could be added. Matting makes the most desirable covering for the floor, as it is much healthier than woolen carpet.

In these, as well as in the other rooms in the house, the furnishings should be simple or elaborate as the taste would suggest or the purse permit.

Now, as to decorations. It has been remarked that the best decoration for the kitchen is a good looking woman who is a good cook.

In the other rooms, as with the furnishings, so with the decorations. They may be either simple or elaborate.

Pictures may adorn the walls, bric-a-brac the mantle-pieces, and curtains the windows, while house plants may be placed in the windows of any or all of the rooms, but everything should be artistic.

CURING CLOVER.

By T. N. RALSTON, *Elderton, Pa.*

In presenting to you a way of curing clover hay that we have adopted and practiced the last three seasons we would not have you understand that we want to spring something new on the public, with no merit in itself, but will endeavor to show you what we have done and how we have done, and the purpose for doing it in this manner.

In June of 1897, we were caught with four acres of clover which was cut on Friday afternoon and rain fell on it immediately after it was cut.

Saturday morning proved warm and foggy, clearing at noon. In the afternoon of Saturday, even before the rain-drops had all dripped off, and no sign of wilting had taken place, we began raking and piling this clover and had it all on shock by evening. Sabbath, Monday and Tuesday following, it rained at intervals. Clearing on Wednesday. On Friday, just one week from the time it was cut, we began to put it in the barn. We turned the shocks over on the side and pulled them apart, leaving the hay as much on edge as possible. We succeeded in getting this hay into the barn in fair condition. This hay seemed to be about as green, soft and pliable, with heads and leaves on, as before it was cut, and it practically continued in that condition until used.

You will excuse me, but I must say right here, although I had made up my mind to try this way again, every time I fed that hay, during the winter, and watched how the stock relished it, I resolved again to cure my hay in this manner.

When the haying season of '98 came along we had twenty acres to cut. We started the machine at the right time and cut and shocked the twenty acres as soon as possible, regardless of weather. Had it all cut and on shock before we put any in the barn. This experiment proved to be satisfactory.

The past season we cut ten acres in the same manner, cutting two crops. This was not so satisfactory on the first crop as the other two seasons had been, the cause being, I think, that we permitted the clover to get too ripe. It did not retain its green color so well, turned a little pale; otherwise we see no difference. The second crop this year is in better condition.

You can see samples of first and second crop of this year's hay here on the table.

Having these three years of experience, would say, that for best results we would commence cutting when the clover is in full bloom with a very few heads turned brown. Would cut in the morning as soon as the clover is fairly dry, and follow with the rake as soon as it has wilted a little; say one-fourth dry, or even less.

Stop cutting in time to have all shocked up before night, making shocks medium size, building them with as little slope as possible on the side until we arrive at a convenient height, then round off with a blunt top, just enough to keep the wind from turning the hay off shock. This is to get a uniform cure. If the shock is too sloping and runs to a point, the top will be over dry, while the bottom will be uncured.

In four or five days after we have done shocking "the flag will be out," or, a more intelligent expression would be to say, that in four or five days from time of cutting the shocks will turn a beautiful golden brown. This indicates that the hay is cured. This brown

color seems to be just on the upper side of outside straw; all green under.

An hour before hauling in, if convenient, have two men or boys (for two can do this better than one), go along and turn the shocks on their sides, and, commencing at the top (one man being on each side), catch in with a fork, six inches down from the top, and set that layer back two or three feet on its edge. Then another layer back against the first one, and so continue until you have done with the shock. The object is to shelter hay from the direct rays of sun, and to allow the hot, dry air to circulate freely through the hay and carry off all surplus moisture.

Now, the purpose of all this is to show that not only better clover hay can be made in this way than in the old way, but that it can be made cheaper and without the customary worry that attends clover haying time, and to show that the great secret of making clover hay is to cure it in the shade. Avoid the sun as much as possible.

Better hay; because it is not injured by sun, rain, or dew, and it is not what we understand by the name clover hay—a dry mass of brittle stalks, with the leaves all gone, or a mass of mouldy stuff unfit even for bedding.

But we do have in this manner of curing, a mass of cured clover, relished by all of our animals, from a bullock to a chicken, and the only difference I see between clover before it is cut, and clover after being treated in this way, is one is in a green state, the other is in a cured or preserved state.

Cheaper hay—why? Because you concentrate all your energy and force on one thing at a time. You start your cutter; draft in all the men and boys about the place to help pile up. If it looks like rain, go ahead. If it does rain some, between showers go ahead and get the clover cut and piled; one or two good rains will do the hay no harm while green. Rather it will do good, as it seems to heat up and cure out better. So you can rush the cutting and be ready to put the hay in when it quits raining, and it always has quit, so far. So don't worry about having your hay spoiled. To have this matter of worry lifted off our mind is a great relief. The energy it saps out of a man cannot be estimated in dollars and cents.

Now, we have tried to show you what we have been doing, and the natural principles we have been trying to discover and work out in making clover hay, and although we feel that we are far short of perfection, yet we do feel that we are on the right track, and with the aid which we wish to solicit from our learned men in agriculture we hope to arrive at better results in the near future.

IMPORTANCE OF SMALL THINGS.

By MATTHEW RODGERS, *Mexico, Pa.*

There is no spot on earth from which a path does not lead straight to the sun. And there is no condition in life that is not in direct line to true and noble success. Good soldiers must make themselves such. The highest commissions in the gift of the government cannot make a man a good soldier. Regardless of circumstances, the making of our lives is in our own power, whether we are soldiers, business men, or farmers. The most of us being farmers, or at least dependent on the products of the farm for our livelihood, and this being a farmers' institute, we will consider a few of the small things in connection with the farm, the farmer, and his family.

We have often been told to never despise the day of small things. In choosing this subject I at first thought it was a small subject, and would be easy to handle, and not much to write about, but the more we consider the subject and study the amount of small things we find needing attention about the farm, the more we get in deep water, and fear the subject too weighty for the one who has undertaken to handle it. We will imagine, now, that we are to have charge of a farm next year. Of course, we all know we must have horses, wagons, etc., but the innumerable amount of small tools that is also needed, such as plows, harrows, cultivators, weeders, planters, drills, forks, hoes, shovels, harness, chains, etc., etc., must all be got in readiness beforehand. It will not do to have to go for a plow-share when ready to plow, a few mower sections when you go to mow, or a horse rake tooth or two when the hay is dry; hay-ladders not in shape when ready to haul hay, binder out of order and no twine when grain is ready to cut. We have all seen some of these kinds of troubles, if not with ourselves, with some one that needed to have their work done on time, as well as us.

While school boys, we often read, "Large streams from little fountains flow; tall oaks from little acorns grow."

As the little acorn was the seed that produced the mighty oak, then every seed planted will produce its kind. The seeds being small things, they are also some of the important things for the farmer to look after, for if we do not begin right, we can never expect to end right. You all know the old saying, "All's well that ends well that has not a bad beginning." See, then, that the seeds are

of the kind and variety that are best adapted to our climate and soils. That is one of the small things that is very important for there are different varieties of soils in our country, and the grain or vegetables that do well on one soil may not do well on a different soil.

There are so many little every day occurrences that turn up that we need to cultivate the mind to be ready for any and all of these things. For instance, a horse has been worked until quite warm, is then given all the cold water he wants, and a case of colic is the result, while a little thought might have prevented it. The cows are turned into the young clover, and a case or two of bloats, and probably a dead cow. We see the fence down somewhere and think we will repair it to-morrow, but before we get there Jones' hogs have been in and rooted out all our early potatoes. It would be a small thing to make these repairs when we see they are needed. Remember, a stick in time saves nine.

The matter of caring for our land and prevent washouts as we see them is a small thing if attended to at the proper time. I think no farmer has had more to contend with in this matter than myself. When I commenced to farm where I am now, the fields were riddled with gutters and washouts. With a little work after the fields are seeded in directing the water in the way you want it to go may save you a sight of labor in after years.

It is said that home is a home if it is ever so homely, and we are pleased to have it. Like the man with his wife in making his speech said, if everybody would have thought as much of his wife as he did, they would have all wanted her; a wag in the back part of the house called and said; "Yes, if everybody would have known her as I did, no one would have had her." We must make the best of what we have and remember that the one who has cast her lot in with us for life will need to be looked after, and her burdens made as light as possible. And one of the small ways we can help her is to have good dry wood and plenty of it. It is a thing we must have, and the work of getting it must be done some time, and it is just as easy to do it in time and save having bad fires, smoking stoves, and scolding wives, for there is nothing so annoying and trying on a woman's temper as green wood and a smoking stove. I hear some one say, I would like to have the wood dry and ready for my wife, but I do not have the time to provide it for her. I will tell you how to get the time. You will have it in this way; rise one hour earlier every morning during the year, and by so doing you will have gained 300 hours, or 30 working days of 10 hours each, and that will give you plenty of time to do many of the little things you complain you have no time for. We should make the home a pleasant place by being pleasant and cheerful ourselves; meet everyone with a pleas-

ant word, or, in short, always have on our company manners; take them with us at all times; they are some of the small things and not heavy to carry.

The temper is a small thing, but hard to control. We should try to control it by first controlling our voices; that is another of the small things; never allow ourselves to speak loud or harsh to anyone when we are excited or vexed. Remember that a soft answer turneth away wrath, but grievous words stir up anger, and by that means we will be able to keep our hired help with us; that seems like a small thing but is one of the vexed questions of the day—how to keep the needed help on the farm. Pay them what you agree to promptly and cheerfully, and get them to be interested in the work by consulting with them about what should be done. Have them feel that they have some of the responsibilities and that they are somebody and that their judgment is of some account, and if they are level-headed they will do the best they can. While it is our duty to be kind to each other it is also a matter of business as well as duty to treat all our animals kindly, care for them in the very best manner; it is a small thing at the time, but will eventually be money in our pockets. Make the farm and home as beautiful as you can. It is a very small thing at the time to plant a few shade, fruit and ornamental trees. Remember, the farm is not a place to be lived on to-day, and move away from to-morrow, but a home to be made beautiful by all the small things that can be added to please the eye; a place where children are to be born and reared, and where parents are to die; where new generations are to go into the fields and reap, as the aged pass away. I fear that too many farms are mere ranches where wealth is piled up for some other generation without a smile or enjoyment by the occupants.

HOW ONE GIRL HELPED.

By MRS. ELIZ. PARRY, *Hatboro, Pa.*

Gabriel South was not a successful farmer, if success means money enough to provide a comfortable living and pay your honest debts. Each year found him less able to meet the interest on that dreadful mortgage, for dreadful it had become to him, and like a voracious monster whose appetite must be appeased with the money which represented so many of the good things he might otherwise have had.

This interest would have given his girls those pretty things in which girls so delight. It would have given his boy that better education he so much coveted. It would have bought that strong team the heavy work of the farm demanded. It would have brought water to the house and barn, the wind doing the pumping and carrying.

To some of you, one hundred and fifty dollars does not seem much; you have given it for the ring that glistens on your wife's finger. You cannot imagine how so small a sum could put dark curtains round a man's conscience, and so shut out the light that he would be apt to swerve from the path of strict integrity. His neighbor, in talking over matters, had said to him, "You are foolish to expect to get along doing as you are doing. I am not a man that ever had much schoolin', but I know a few tricks that are worth more than all your book larnin'. I'll tell you one or two, if you won't give them away, for it don't do for too many to catch on. Now, when I want to hire a man, I always look out for one who has no friends in this part of the country. When his time is about out—and I never have any money for him between whiles—when his time is about out, I trump up some dreadful charge against him, threaten him with the law, etc. The outcome is the man is so frightened he is glad to get away—wages or no wages. Our girls, when we have any, we manage in the same way. Oh, it's easy, after you learn how, and those fellows eat so much anyway, they don't earn more than their board." Various other "ways that were dark and tricks that were vain" were recited for Gabriel's education. But one night, the light of a burning barn showed to this worse than "Heathen Chinee" that in some of these games two could play.

As the stress of poverty became more and more heavy, he brooded over these confidences and temptations of his rich neighbor until his mind was so clouded with melancholy that he hardly knew the right from the wrong and almost lost faith in the justice of God or the integrity of man.

Seeing her father's distress of mind, his oldest daughter often asked herself the question, what can I do to help?

She knew that school teaching was out of the question, as her education had not been such as would enable her to obtain the certificate necessary to enter the ranks of that profession. As that door was closed, was there any other she could open? A friend of hers taught music, going from house to house on her bicycle in good weather, and using one of the farm horses when the roads were bad. But the song of the birds, the humming of the bees, and the joy of the young life within her were the only factors in her musical education. On this farm, the piano and the mortgage had not

made acquaintance; the one frowned so darkly the other dare not trespass. But this heroine, though she might not be an accomplished linguist, though she could not finger with skill the harp or banjo, could set a patch neatly and darn a stocking in a manner her father and brother thought more handsome than any embroidery. One day, when she was visiting a cousin, one of those overburdened women whose patch-basket is never empty, and while doing what she could to reduce the size of it, she told of her desire to be a support and not a burden. As they were sewing and talking, this cousin said to her: "Julia, how I wish you would come over every week and help me with my mending. I would be very willing to pay you, and you do your work in such an efficient manner; I know there are others who would be glad to do the same. I do not seem to be able to keep any help, although I pay all the wages they ask, and while it is possible by good management to get along with the rest of my work, to have to sit up night after night patching and darning when the others have gone to bed is that last straw that breaks the camel's back."

It seemed like queer employment, but why not? The fathers of the family would certainly approve of having the buttons all on and no holes in their stockings; but few favored fringes on their wristbands or coats out at the elbow. Would they not think their money as wisely expended for these things as given for lessons in music? And as for the mothers, their verdict was a foregone conclusion. When her friends found she was not above receiving the honest penny for honest work, she was much in demand. Not only to lower the mending basket, but to have the oversight of those social affairs in which a neighborhood delights, but which often prove such wearisome things to the givers. One woman thus expressed herself. "Certainly I would like to entertain—have a little party every once and a while, but I cannot afford a caterer or to buy my provisions already prepared, and I never will go through what I did the last time I tried to pay some of my social debts. The half-done turkey, the greasy oysters and that big spot of cranberry on the table cloth filled me, thrilled me with such terrors never felt before, and like the Raven, I said, 'Nevermore'."

To be able to enjoy their friends' conversation and not have their thoughts distracted by a thousand wonders as to this and that, whether this thing was burning or that cooking; whether the children were upsetting the ink bottle or pulling off the table cloth, etc., etc.; to have someone arrange the table, and serve the meal in an artistic manner; to turn on the lights at the proper time; to attend to all these as well, if not better than they; was what many had prayed for and but few hitherto attained. Julia's home training had been such that she just fitted this waiting niche, and for her

labors she received not only her pay, but the heartfelt thanks of her employers.

The first few dollars that she had earned gave her a taste for more, and, being a girl of original ideas, of executive ability, and what is most essential, of health and strength, she soon found other work that willing hands could do. About the time currants were ripe, she said to her mother: "Last summer, when Aunt Maria was here, she told us she paid twenty-five cents a glass for currant jelly and it was not so good flavored as ours. When father goes to market, I think I will send a few glasses, and if he sells it a little lower than the grocery stores do, perhaps we can get custom for it. Shortly after this conversation took place, a letter came from the aforesaid Aunt Maria asking if they could not make for her some jelly like the kind she had eaten when she was there. She would be willing to pay what she did at the store, and would know it was pure and clean. Quite a number of Aunt Maria's friends sent orders for jelly, when she let them taste its sweetness, and told how she came by it, until from that neighborhood no currants went to market in the raw state. This was such a paying employment that when currants were gone other fruits took their place and went through the same process.

While the jelly season lasted the mending basket may have been somewhat neglected, but it was never despised, and in after days she often said her first step upward was in one of these. Her father had said to her in the fall: "Julia, if I should get two or three turkeys to keep over, do you think you and I could raise a flock next summer?" As none of their near neighbors were in the business and no woodland near in which they could hide, she thought and said, "Why not?"

Many a farmer's wife has been reduced to a very limp condition by the four C's—cows, cooking, chickens, and children—but found there was deeper water yet to cross when she tried to go on to turkey. In this present embarkment a man was at the helm, with his seven league boots, and when the rains descended he could pull this cargo of turkeys to a safe Ararat and be none the worse for it, thanks to a very sensible custom men have of dressing to suit their occupation. Here also, a woman was engaged who did not have the supper to look after and a lot of sleepy children to wait on just at the time when the turkeys should be hunted and fed. Of course, under this management, they were enabled to turn quite a good deal of their corn and wheat into turkey meat, and received good prices for it. The tail feathers adorned the hats of many a belle, and though they brought but little a bunch, they helped to increase the pennies in the pile.

One day, when at the store, she saw a small bottle marked,

"Gherkins," and upon asking its price, was told it was twenty cents. Instantly the thought came, "Why not?" Bottles were cheap, there were barrels of vinegar in the cellar for which there seemed no sale; they had the land on which to raise the cucumbers, and best of all, she knew how. Was not her mother noted for her good pickles among all her acquaintances? And was not she her mother's own daughter? That year, and not that year alone, the truck patch contained more than one long row of cucumber vines. They had to fight the beetles, to counteract the drought with the hose, the picking was back-breaking business, but when orders came for more pickles just like the sample, the troubles of the past were forgotten in the joy of the present. After a time, as she did not abate in the excellence of the jelly-or pickles furnished her customers, she had as many orders as she could fill. Her father, finding how much better prices could be had for the manufactured article than the raw material, altered his manner of farming, and in connection with jelly and pickles a canning factory was established. By these combined means the mortgage was not only driven from the farm and the piano invited to enter, but there is a home market in that neighborhood for all first class vegetables and fruits, and the burden of debt lifted from many a weary laborer.

LIGHTING, HEATING AND VENTILATING THE HOME.

By MISS MELVINA LUSK, *Volant, Pa.*

The home is recognized as the place most frequented by mankind in general. Whatever is related to the home should be conducive to the health and happiness of those who spend the greater portion of their time in it. To serve this condition, the manner of its lighting, heating and ventilation is of no little importance. Defects in this line produce a needless injury to health in many homes. With the present abundance of information on the subject of healthy homes, why should they be constructed and regulated on otherwise than approved methods? A few facts of my own and others' observation may be presentable.

It is well known that light exercises a salutary influence upon the whole system. Yet its hygienic importance should be more studied than it generally is in the building of our houses. We know how the plant or vegetable struggling to grow in darkened rooms be-

comes feeble and light in color; and how persons living in poorly lighted apartments become pale, less vigorous, and sickly. All houses, then, should be so arranged that each room may be well lighted, and the kitchen and sitting room being the apartments most used, should be planned for the most pleasant and best lighted portions of the house. Don't be afraid to let in the sunlight; not that we should live the entire time in the strong sunlight, but that there should be means to admit the direct rays of the sun into any room in which we live. There may and should be curtains or blinds to modify the light, not to exclude it all the time, as is frequently the case.

The penetrating influence of the sunbeam will do more to impart vigor to the body and the glow of health to the cheeks than any quantity of medicine, though both are often a necessity. The limited amount of sunshine that finds its way into the narrow courts and alleys of the large cities is partly the cause of the stunted growth and pale faces found there. We are told that it is the increased intensity of the sunlight in southern climes that makes them so beneficial to many invalids. It is also demonstrated that sunlight is capable of destroying germs of disease. Sir James Wylie states that "the cause of disease on the dark side of an extensive barrack in St. Petersburg have been uniformly for many years in the proportion of 3 to 1 to those on the side exposed to strong light." Do not such facts favor the well-lighted room? Besides the invigorating effect of light on mental and bodily health, its presence makes a room more pleasant and inviting. High windows are recommended. In regard to artificial light, little may be said, except that sufficient should be furnished to render easy what is done with its aid. In working or reading with both natural and artificial light, it should fall upon the work or reading matter from over the shoulder, not where the rays fall directly upon the eye.

Notwithstanding the beneficial effects of light, no amount of sunlight will afford sufficient heat for human comfort in the winters of this temperate climate. The rooms of our houses must be heated artificially, and with the absence of natural gas in this section, coal and wood burnt in some manner are the only accessories. In heating, the aim should be to furnish an even temperature, somewhere between 60 and 70 degrees, as rooms too highly heated will lessen the generation of heat in the body, and likewise the power of resisting cold; this fact may be illustrated by a sudden change from a hot to a cold climate. If an inhabitant of Cuba were quickly transferred to Greenland, the cold would be almost unendurable, and if, after he had become accustomed to the cold of Greenland, he is returned to his native island, the heat would be as unbearable as was the cold in the first instance.

It is a well known fact that the open blazing fireplace, although an expensive form of heater, is the best for ventilation, happiness and home cheer. The stove furnishes more heat, but is not so good as a ventilator, because with the open fireplace a much larger amount of heat and air are carried up the chimney. It is shown that the unpleasant heat of stoves may be partly avoided by providing stoves which have a large surface of metal, so that the heat may be distributed evenly over the iron without heating any part to redness, since red-hot iron allows the passage of harmful gases formed in the burning of coal. A disagreeable feature of the stove is the dry air which it furnishes. In all heating, a certain amount of moisture must be present to meet the requirements of comfort. An open fire door does not dry the air to any great extent, but the stove should have a receptacle for water.

Steam radiators are objected to on account of their lack of ventilation and their greater expense.

The warm air furnace brings from outside of the house a constant current of fresh air, carries it over heated surfaces, and discharges it by means of pipes into the different apartments. It is highly recommended for heating purposes, since it serves as a partial ventilator, supplies a moist air, and, if adapted to the building in which it is placed, does not allow the escape of gases, smoke or dust into the rooms which it heats. To supply pure, warm air, it is necessary that the fresh air pipe open directly into the fresh out-door air.

There is a close connection between the methods adapted for heating and those intended for ventilation. Ventilation is defined as the problem of changing the air in a room with sufficient rapidity without at the same time creating draughts. It is generally understood that such a change is necessary in an occupied room, because each occupant in every act of respiration is drawing from the air of the room a certain quantity of oxygen and giving out in its stead a quantity of poisonous carbonic acid gas, besides impure exhalations from the skin. In a large number of homes no means are used to remove this foul matter, and what was rejected by the body is rebreathed again and again, not only by the person first rejecting it, but by all the inmates of the room. In the blood thus poisoned is laid the foundation of disease. No building materials, and no windows nor doors are absolutely air-tight; if they were so, some modern buildings would be unfit to sustain life, and the history of the "Black Hole of Calcutta," with its high death rate, might be repeated in many churches and school houses of the present day. Since pure air is free, and since the rooms of our houses may be supplied with it and still be comfortable with a little extra fire, why need we suffer with head-ache, lassitude and disease as a result of its continued lack?

Ventilation depends upon the principle of warm air rising when surrounded by cold air. There must be two openings to produce a thorough change of air; one for the removal of foul air, the other for the admission of fresh air. This may be easily accomplished in a living room in cold weather by lowering the upper sash of the window, as this affords an escape at the top for the air of the room and the entrance of fresh air between the upper and lower sash, or an outflow of air may be secured by means of the open stove, a chimney or ventilating shaft, and an admission by the door or window, if the hot air furnace is not used. Dr. Bell suggests that an efficient foul air shaft may be fitted to the common stove by inclosing the stove-pipe in a pipe two or three inches greater in diameter, being left open at the end next to the stove. In summer, ventilation may be provided for by opening windows at both top and bottom on the sheltered side of the house. Sleeping apartments and the bed-clothing should be aired each morning. In the sick room is even more need for ventilation. Instances are known where the patient has been compelled to lie in a very small, close, hot room, and allowed to breathe with difficulty the stifling air, besides enduring the suffering of disease. It was formerly believed that every precaution should be taken to prevent persons ill with small-pox from breathing fresh air. When a lady in South Carolina has this disease, her friends, after they thought life was extinct, caused her body to be removed to an open shed. The pure air revived the vital spark and she recovered. When the vapor breathed from the lungs begins to collect in drops upon any window, it is time to increase the supply of fresh air.

Thus, to furnish a room that is both healthful and pleasant depends upon the quantity of air admitted, as well as upon the manner of supplying light and heat; when our houses, therefore, are properly lighted, heated and ventilated, much will have been accomplished toward the making of the model home.

INTENSIVE FARMING.

By B. H. DETWILER, *Hughesville, Pa.*

I have been assigned the pleasant duty of discussing for your consideration to-day "Intensive Farming."

The farming of to-day is not the farming of a half a century ago,

though prices rule about the same. The advantage of farm machinery does not equal the additional cost of living, and we are drifting more deeply in debt. We cannot, with our higher education, return to the manner of living of that period, nor would it be desirable. Then not one man in twenty had an overcoat, and one pair of shoes was the allowance of a growing boy or girl for winter's use. When they were worn out, we went barefooted. All classes were economical. My grandmother's story may illustrate it. On Sundays they would walk within sight of the church, carrying their shoes, and on returning home would remove them. In all departments of the household this rigid economy was enforced. Money was made and farms paid for by savings. All labor was manual. It was work every day; women worked in the fields with their husbands and children; besides doing the household duties.

My father, for that period, was a prosperous farmer. He kept a dairy farm of 40 cows. My mother milked ten of them daily; she considered it no hardship—it was the custom of the country. All rode on horseback. There were no wagons for pleasure; even in 1855 there were no covered wagons in the prosperous Lycoming Creek valley. Three minutes gait was a fast horse and 2.40, phenomenal. One hundred dollars would buy the pick of horses. These were the good old times to which distance lends enchantment.

The grain merchants in Philadelphia made corners in wheat at their option, from the Susquehanna and Lebanon Valley products. These were sold from the farms and a legacy of exhausted lands was left. By the judicious use of lime, fertilizer and rotation of crops, some of its wasted fertility was restored, yet we cannot compete with the virgin west in cereals. We have our farms and a crushing competition with the incubus of indebtedness.

The question that interests us beyond anything, is how we can make farms remunerative and keep our children interested in the farm and farm life. We cannot recede into the ways of the past; nor is it necessary, as we have a higher intelligence which we must use to lead us into ways that are profitable and pleasant. We must have larger crops of farm products. We must plow less ground and make the land more productive, raise better crops, more cattle and make more manure and take better care of it. Accepting the fact that we cannot compete with the great west in cereals is no reason why we should not raise them; but, instead of selling them at these ruinous prices, have enough cows, pigs and poultry to consume them, marketing them and their products, reserving their excreta to be restored again to the farm in the shape of well decomposed manure, neither leached nor burnt. In either case, we have only organized matter instead of highly nitrogenized plant food.

The ammonia we see escaping from freshly cleaned horse stables

and compost heaps is worth 14 cents a pound. A handful of gypsum or plaster scattered over the stables or escaping vapor, will fix it so that it cannot be volatilized. Where ground is reasonably level, the sooner manure is placed on it the more benefit will be derived from it by the farm. The simple fact that you place excreta of cattle upon land does not enrich it any more than the same plant would have done had it been left on the ground. The grain you give the animals is the agent that enriches the farm and the grain you sell impoverishes it.

The farm buildings should be large, airy, roomy, filled with sunshine, with large airing courts protected from the cold winds. Cattle should be soiled, not pastured, as they tramp more grass than they eat. Scrub cattle are an expense, not a profit. The bull is half of the herd. It is a matter of prudence to have your herd tested for tuberculosis and not purchase an animal that is not tested. Several of our most admirable herds have been nearly exterminated by the introduction of fine cattle with tuberculosis. The Singlerly herd has this unsavory record. The tuberculin is furnished by the Agricultural Department free of expense, and with the aid of a clinical thermometer and a hypodermic syringe you can test your animals without any expense and determine whether your cattle are immune. The demand for cattle is size, with the butter and milk strains fully developed.

It is advisable to decide whether you will raise milk or beef cattle. You cannot combine the two profitably; they are distinctly separate. In order to secure size I am favorably impressed with the Durham cow, crossed with the Guernsey bull. This theoretically would give a large frame with the noted milk and butter strain of the male. They would be the ideal large, yellow skinned cows, which are as much in demand as the yellow legged chicken. I would not pasture a foot of ground, beyond using in pleasant weather and enclosure for sun and exercise; where a farm has a woodlot it would be well to use it for this purpose. In addition to preventing the waste of pasturage and solidifying the ground, it would save the expense of fencing, which is a large item of fixed charges independent of the item of lost ground. A farm of 160 acres has a loss by roads and fencing of five acres, worth on an average \$300, for which you pay taxes and receive no benefit. It is a matter of economy to raise your calves and keep them growing. A stunted calf is like a stunted pig—of no value. When a steer is two years old it should weigh from 800 to 1,000 pounds. It has not cost you anything beyond your labor, and being soiled, all the excreta remains as a valuable plant food. A test that I made in a small way illustrates it. Two lots, 150 by 200 feet, gave a scanty subsistence to my cow. The land was in a high state of cultivation. By keeping the cow in a shady, cool

shed with a yard, I had enough grass for her and four horses. The cow gave more milk, kept in better flesh, and the horses appreciated the change.

The succession of soiling crops you fully understand, and by its use you can quadruple the number of cattle the farm will maintain. A silo is indispensable and inexpensive. My friend, Mr. Manley, of East Canton, put one in his barn two years ago, 17 by 14 in the clear. Independent of his own labor it cost him \$69, with a capacity of 120 tons. Prof. Hamilton assures me that he can raise 16 tons of corn silage per acre, and that it requires four tons with clover hay and bran to keep a cow or steer for 200 days. It is well to use roots for your cows. At the Danville Hospital farm four acres gave 108 tons of mangle wurtzel. The corn on 35 acres yielded 4,500 bushels of ears. The farm has 81 cows, whose average yield for 365 days is 15 pounds. We have not found it profitable to pasture them. In addition to this milk, the Hospital purchases from the neighboring farmers from three to four hundred dollars' worth of milk per month annully. We have not been able to secure an appropriation to erect silos, which we hope to build in one season. I prefer a circular or octagonal silo. Independent of succulent winter food, it gives cheap food when the high temperature produces a crop failure.

There is a constant demand for large milch cows in the dairying district near Philadelphia, where they place their dry cows in the shambles and find it more profitable to purchase fresh ones. It is more advisable for the farmers to ship jointly their cows to this market in carload lots, than to sell them to dealers, who make large returns. Where herds are once established they are a source of permanent income with increased fertility of the farms. I present a clipping from the "Dairyman" that expresses farm production:

HOW MANY COWS ON EIGHTY ACRES?

"How many cows can I keep on eighty acres of land where corn will go sixty bushels to the acre, clover two to three tons to the acre, but land too rich for oats—all goes to straw. Would have a rotation of corn, barley and clover, cutting the latter for hay one year, and pasturing in it the second year, and following with corn after manuring.

Hillsboro, Wis.

G. K. R."

A man could easily keep forty cows on eighty acres of such land, but what with horses and other stock, and some general farming, it would be better to commence with a smaller number.

HOW LARGE A SILO?

The same inquirer asks:

"How large a silo would I need, and how much corn would I have to plant to fill it? I would have about forty tons of clover hay in addition to silage. Bran is worth from \$10 to \$14 per ton."

Two silos are much better than one. One silo, sixteen feet in diameter and twenty-four feet high, will hold sufficient silage to feed thirty cows two hundred days, which will suffice for winter. But there will come the summer drouth and other exigencies, which can not be in any other way so successfully met as with silage. Therefore, a second, but smaller silo should be built for summer, say fourteen feet in diameter and same depth. Eight acres of corn should fill the larger silo, and five acres the smaller one.

We would recommend for winter use, if your cows are in full flow of milk, as they should be, about as follows:

DIGESTIBLE NUTRIENTS.

Formula for Ration.	Dry matter.	Protein.	Carbohydrates.	Ether extract.
30 lbs. silage,	7.92	.39	4.20	.21
10 lbs. clover hay,	8.47	.68	3.58	.17
4 lbs. bran,	3.54	.50	1.54	.12
4 lbs. gluten feed,	3.65	.81	1.94	.14
Totals,	23.69	2.36	11.06	.64

Give in addition as much other coarse fodder as cows will eat.

He asks further:

"Which would pay best?—Raise the steer calves (I have a Durham bull and native cows), and feed them on skim milk and barley, or have the Jersey or Guernsey, and feed the milk and barley to pigs, and veal the calves?"

If one proposes to make a business of dairying and wants to keep cows for profit, he ought to set about getting a herd of dairy cows. He cannot get such a herd with any certainty by using a Durham bull, but should have a Guernsey, Holstein or Jersey. We cannot choose among these breeds for other people. Each has merits peculiar to itself.

COST OF SILO.

The two silos above described, if built on the stave pattern, will require not far from 6,000 feet of lumber and nine thousand shingles, and from sixteen to twenty hoops of five-eighths-inch round iron.

It is not advisable to have too protracted rotation of crops. Clover should be turned down after one mowing. The soil has the advantage of the clover roots and its nodules of nitrates, and where timothy is desirable it would better be a separate crop. Timothy exhausts soil quickly and does not produce a good ration for cattle. When clover is properly cured by fermentation in cock, it is not dusty and makes an admirable ration for horses and cows. Sheep are more profitable and would be an excellent addition to the farm revenue, were it not for dogs, who raid them and demoralize in a night the work of years. The goat will make a valuable substitute for sheep. They do well on wild lands and are antagonistic to the dog crop. You can have them browse on slashings for eight to nine months annually. They are more prolific than sheep, and can safely be turned in the wheat fields. They will eat the briars and sprouts in preference to the tender grain or grass. In five years they will clear wild lands, so that they can be used for cattle ranges. They furnish a superior food. Germans tell me they prefer a kid to a lamb, and I see no reason why they should not be the coming venison. We import from Europe and Asia \$20,000,000 of skins annually. The goat I would prefer is the Angora, large, long-haired, hardy, and a dog fighter. The hair is used for mohair cloth, worth 30 cents a pound. A buck will clip ten pounds and a doe from four to six and some say six to eight pounds. The market for the meat would be in the coal regions among the Huns and Slavs, who have been educated to appreciate this valuable animal.

Another special culture should be the hog. They are a good substitute for the wheat as a cash producer. They are omniferous eaters, do well on a clover field, turning the skim milk with brewers grains (10 cents a bushel), shorts and cake meal, into hard cash. They are more profitably disposed of when ranging from 150 to 175 pounds.

Poultry is frequently a neglected factor in the farm economy, living the best they can, raised without system, producing eggs when they bring the least money. The large egg producers are the small varieties, but are not a marketable fowl. As a general all around fowl I prefer the Plymouth Rock or Dorking, large, strong, active, good layers and bring good prices when marketed as broilers or full developed fowls.

At present a dozen eggs will buy a pound of butter. Fifty chickens, hatched early in the spring will lay in November and catch this

profitable trade, and will discount the profit of two cows at the price of one cow's feed, with less loss and less labor. All these farm products to be profitable require careful attention. It is seldom a success as a sole factor in this country, but in France they have large and profitable chicken farms, conducted solely by women. The profitable farming includes the utilizing of everything upon the farm, draining every foot of wet land and especially preparing the ground for the crops. There should not be more ground plowed than can be manured, either with barnyard manure or fertilizers and fully comminuted. The roller should follow the plow before the furrow becomes dry, then harrowed, and harrowed so frequently that the ground is like an ash heap. You have then a seed bed that the rootlets of the crop can secure its plant food.

Lime is a good means of changing the humus of the soil into this plant food, but it is pooreconomy to lime your ground unless you have enough vegetable matter for it to burn up, without this humus you burn your land. The cheapest way to restore the humus in my opinion, is to plant oats with a fertilizer. When changing color, plow down as a seed bed and upon this plant your wheat or rye with grass, following this with lime and you have made a rapid advance in the fertility of your soil. Nature has given the soil enough phosphorus, unfortunately not available with our extravagant farming, but with a shorter rotation of crops. Clover plowed down with its wonderful crop of roots, and your experience confirms this statement.

The reason rye is not a good crop to plow down green is that there is less than one per cent. of phosphorus in its ashes, while oats have about 12 per cent. Unless the ground is in good title and has enough plant food in it available for the crop, farming does not pay. The hard work is done, and medium crops repay the husbandman. Many farmers have too much land wasted in neglected fence rows, sprouty land and worthless trees. Illustrating this point, one of my farmer friends has a valuable river farm. He is a good farmer, works hard, makes a good living and but little money. Across from his barn he has a four-acre flat, spouty piece of ground. A spring has made a run through it. There is fall enough to drain it. This land would, under proper cultivation, produce 12 tons of hay annually, or 50 or 60 tons of corn silage, yet it is a tramping place for hogs, cows and chickens.

Another friend had a large farm in partnership with his son-in-law. They concluded to divide the farm. With half the land he has, with more time and better farm work, his barns and granaries are as full as he had with all of his land. He had a swampy, spouty lot near the house, but had no time to care for it. He has it drained and it is far the most productive piece of land on his hill farm, worth

more than some of his large fields and is right at his barn, with half of his farm is paying off the mortgage.

The reason we have impoverished land, is that the humus is exhausted. Phosphorus is present but not in available form for plant food.

Timothy is a strong feeder and impoverishes the soil. Clover hay is an ideal food. When cured in cock, it is free from dust and has made its fermentation in the field. There is no profit in relying upon fertilizers for a crop. It is expensive and exhausts the soil. The farmer's fertilizers is his barnyard manure, enriched by passing through his stock with grain food. It is the farmers' bank, and when leached by the rains and burnt in the yard, it is merely vegetables decomposed and of little value, the ammonia being both volatile and soluble.

It is a good plan when the fields are reasonably level, to place the manure upon it as fast as it is made, not in heaps, but broad-cast. There would be a certain loss by evaporation, but if mixed with plaster in the barn, it would fix the ammonia.

The first point in intensive farming is to have your ground in a proper state of cultivation with a surplus of plant food. Stable manure is the sheet anchor, and stock is the manure maker. The nearer the fields are enriched like the garden, the more intense can be your farming.

On my experimental grounds I had a short crop of hay, plowed the timothy sod, planted the eight row yellow corn on the third and fourth of July. It made a good crop of ears, but the premature frost was about ten days too soon. Next year I will plant a couple of acres of timothy sod, after curing the hay ten days earlier and expect to have a fully developed crop of corn and fodder, two crops in one season. In its cultivation, the season being unusually dry, I followed each shower with the cultivator, forming a dust blanket, preventing evaporation. I estimated to have between two and three acres, upon a hill. It never suffered from the drought and yielded 175 bushels with a fine lot of corn stover. A large amount of this corn was soft, but by late husking will make good cow feed. A clover sod, after yielding a crop of hay, will furnish a corn crop annually of the early maturing varieties, or would make excellent silo corn.

The necessity of the farm is the caring of stock with ample food supply. The preservation of the animal excreta, the feeding of the roughage to high grade animals with the grain your farm produces, whether cows, pigs and poultry, or more profitably, all combined, selling the concentrated products, not the crude material, in this way securing the highest returns for your labor. This cannot be accomplished unless you provide ample, comfortable shelter for your

stock. They must have warmth, or you will have to supply extra food for this purpose, with impaired assimilation. An hour's exposure to cold winds with icy water, will perceptibly diminish the milk secretion and fat forming capacity, in your stock.

Your homes should be beautiful—flowers and all kinds of fruit trees planted. A profitable tree to plant, independent of your orchards, is the walnut. They are deep rooted, fast growing trees, delight in low rich grounds, sheltered from the winds, and in less than half a century will pay for the farm. The walnut will have its cycle of demand and there is none growing to fill it. The ground can be farmed close to the tree and the shade does not injure the grass and grain like the maple.

Utilizing all waste grounds and products, husbanding your fertilizers, wonderful crops will repay your labor, and your income from your fine stock will enable you to live with that comfort that is now a stranger to most farm homes, and your days will be days of pleasantness, and your lives will be cast in pleasant places.

TRUSTS.

By F. W. WHEATAM, *Wilkes-Barre, Pa.*

Out of the three or four subjects which were suggested to me for this occasion, I rather ambitiously chose to talk to you upon the subject of the trust problem, although I was well aware that within the limits of an address such as I would be expected to prepare for you, I could only touch upon the most general features of the subject, and point out to you, in the most general way, what merit was claimed for the institution on the one hand, and what dangers were apprehended from it on the other. Nevertheless, considering the importance of the subject, and how vitally the outcome of it will affect us, not only as a nation, but as individuals, I have presumed, not to give you my own thoughts of the matter, but to gather together the best thoughts of the best thinkers, and lay them before you, so that your own thoughts may be quickened, and your own ideas developed, along the line of what is shortly bound to be the all-absorbing economic question of the country.

This trust problem will become an issue in politics, and our franchises will be sought to maintain, to check, or to overthrow it, and it is our duty, therefore, as good citizens, to learn what we may

about it, from the best sources available, calmly and dispassionately, before the argument becomes clouded by party bias, and pressed upon unduly and perhaps unfairly by party zeal.

I do not wish to be understood to say that partisan sources of information are more reliable than party sources. I would not ask you to turn to the President of the Standard Oil Company for an unbiased and unprejudiced expression involving the merits and demerits of the trust. Nor, on the other hand, would I expect you to rely upon the opinion of the Governor of Texas, or the Hon. Mr. Peiffer, as to certain dangers which they claim are bound to attend upon every aggregation of capital. But there is a tendency, not easy to overcome, when the battle is on, and the issue has been drawn, for Republicans to believe what they consider to be Republican doctrine, and for Democrats to believe what they consider to be Democratic doctrine, and when that time arrives, the goats separate themselves from the sheep and the time for calm, dispassionate argument is past.

It is my idea, therefore, that before that time is reached, it is our plain duty, just so far as we may, to inquire into the matter, and to reach a fair conclusion as to its merits, its dangers to us and to our fellows, if such are likely to exist, and to devise the best methods of checking, counter-acting and overcoming those dangers.

A trust is defined to be an organization or association of industrial corporations, a majority (at least) of the stock in each of which is transferred to a central committee or board of trustees, who, while issuing to the stockholders certificates showing their interests and rights to dividends, exercise the voting power of the stock, in electing boards of directors for the various associated corporations, and in other ways, and thus direct their policy for the common object of lessening competition, regulating production and lowering its cost, and increasing profits.

The trust is a creature of the "end of the century," and its advocates claim that it is a necessity of the times. When trade was small and the market restricted because of the absence or inefficiency of transportation, individual capital and individual effort sufficed to meet the demands of trade.

When the facilities for transportation came to be developed, and the ability to produce was multiplied; when the stage coach gave way to the locomotive, and the hand cleaner to the cotton gin; in other words, when the market was broadened and the manufacturer and producer had the goods and the product ready for the market, individual capital and individual effort was driven to the wall by competition against larger individual capital and greater individual effort, and in its struggle together and combining capital and effort in the common cause.

This led to partnerships, general and special, and to limited associations of various kinds, and to joint stock companies; and when demands for aggregate capital became larger and men were not willing to stake their all in a single enterprise, corporations were invented, so that the liability of the contributor might not be general, but special, and dependent upon the amount of his interest in the concern.

A man would be rash to assert to you that corporations are an unqualified good—but in my judgment he would be equally rash if he were to say to you that they were an unqualified evil. Their necessity and their general power for good is quite apart from the incidental evils which attend some of them, and the balance is so largely in their favor, that even those who are most prejudiced are bound to concede that they have been, and now are, powerful and potent factors in the material prosperity of the country.

Let me call your attention to expressions of learned jurists upon this subject—expressions called forth by important trials pending before them, wherein the cause for and against corporations has been urged and fought by men learned in the law, and learned in the subject which we are considering:

Says Judge Caton, of Illinois: "Corporations have become among the greatest means of state and national prosperity."

Our own Judge Gibson, Chief Justice of the Supreme Court of Pennsylvania, says, in *Commonwealth vs. Carlisle*:

"The combination of capital for purposes of commerce, or to carry on any other branch of industry, although it may in its consequences operate on third persons, * * * is a common means of the ordinary course of human affairs which stimulates to competition, and enables men to engage in undertakings too weighty for one individual."

Says Mr. Justice Field, of the United States Court, "As a matter of fact, nearly all enterprises in this State, requiring for their execution the expenditure of large capital, are undertakings by corporations. They engage in commerce; they build and sail ships; they cover our navigable streams with steamers; they construct houses; they bring the products of earth and sea to market; they light our streets and buildings; they open and work mines; they carry water into our cities; they build railroads and cross mountains and deserts with them; they erect churches, colleges, lyceums and theatres; they set up manufactories, and keep the spindle and shuttle in motion; they establish banks for savings; they insure against accidents on land and sea; they give policies on life; they make money exchanges with all parts of the world; they publish newspapers and books, and send news by lightning across the continent and under the ocean. Indeed, there is nothing that is lawful to be done

to feed and clothe our people, to beautify and adorn their dwellings, to relieve the sick, to help the needy, to enrich and ennoble humanity, which is not to a great extent done through the instrumentality of corporations."

Now, trusts, as we have seen, are merely combinations of corporations, where aggregate capital is combined, and put under the control of a central board, and unless that process of association is fraught with some particular evil, the power of the trust to develop material good and prosperity ought to be greatly enhanced, without disproportionately increasing its liability to do harm and to impede prosperity.

All of the arguments which are advanced against trusts dwell upon the alleged increased ability and disposition of aggregate capital to make for the wrong, to create monopolies, for example, and thus stifle competition and destroy individual industry, to decrease wages, thereby lowering the cost of production and increasing profits, and to increase the price of the trust product.

They put behind them the argument that the ability of the trust to make for good and for the general prosperity is also enhanced, and they ignore the fact that the only trust which can become a monopoly is one that can gain control of some natural resource, such as oil, and that the Standard Oil Company, the commonest illustration of a trust monopoly, has never had a wage difference with its men, and while it has bettered the quality of its product, has kept the price of it down, so that it is just a trifle more expensive than daylight.

There is one aspect of the argument against the trust, however, which I think may be conceded: It does tend to prevent competition. Now, there is an old saw, more flippant than truthful, that "competition is the life of trade." In these days, when capital is embarked in special enterprises involving costly machinery, it is impossible to withdraw it, or even reduce it, if the business becomes unprofitable. Competition in such cases leads quickly to a marking down of prices, each getting lower and lower in price, to hold or secure trade, and it is known as "cut-throat" competition. If it is the life of trade, it is the death of the trader. It is one of the very things which has led to the formation of trusts, for I can assure you that when a manufacturer has to decide between "trust or bust," the outcome of that decision is not at all uncertain.

"If it be true, also," said a learned judge, "that competition is the life of trade, it may follow such premises that he who relaxes competition commits an act injurious to trade; and not only so, but he commits an overt act of treason against this Commonwealth. But I apprehend that it is not true that competition is the life of trade. On the contrary, that maxim is one of the least reliable of

the host we may pick up in every market place. It is in fact the shibboleth of mere gambling speculation, and is hardly entitled to rank as an axiom in the jurisprudence of this country. I believe universal observation will attest that in the last quarter of a century competition in trade has caused more individual distress than the want of competition.

"Indeed, by reducing prices below, or raising them above value (as the nature of the trade permitted), competition has done more to monopolize trade, or to secure exclusive advantages in it, than has been done by contract. Rivalry in trade will destroy itself, and rival tradesmen seek to remove each other, rarely resorting to contract, unless they find it the cheapest mode of putting an end to the strife."

In deciding a case in the Exchequer of England in August, 1888, Lord Coleridge said:

"It must be remembered that all trade is, and must be, in a sense, selfish. Trade not being infinite, nay, the trade of a particular place or district being possibly very limited, what one man gains another man loses. In the hand to hand war of commerce, as in the conflicts of public life, whether at the bar, in Parliament, in medicine, in engineering, men fight on without much thought of others, except a desire to excel or defeat them. Very lofty minds, like Sir Philip Sydney, with his cup of water, will not stoop to take an advantage, if they think another wants it more. Our age, in spite of high authority to the contrary, is not without its Sir Philip Sydney, but these are counsels of perfection which it would be silly indeed to make the measure of the rough business of the world, as pursued by ordinary men of business."

For a certainty, if the words of these men be true, the lessening of competition by the formation of trusts, is not hurtful to trade, but rather beneficial.

So many people persist in referring to trusts as "gigantic monopolies," that they have come to be generally known as such, and a monopoly is one of the things that the free-born American citizen naturally resents. It was well said by one of the delegates from Pennsylvania to the Trust Congress at Chicago last September, that "if consolidation of industrial plants prevented competition and created monopolies, all thinking men would condemn them; but if, as some believe, they only prevent that competition which is injurious, and stimulate that competition which is beneficial to the public, then, instead of curses, they are blessings."

If any considerable number of people persist long enough in calling an enterprise by a hard name, it will get to be known by that name, whether it deserves it or not.

I have already suggested to you that the creation of a monopoly,

by the aggregation and combination of capital in the form of a trust, was not possible, except in those cases where the product of the trust was some natural resource, like anthracite coal or oil, and the trust might secure practically all the product.

But even in these cases, ability to substitute something else for the product monopolized, that is to say, that fear of competition which is quite as efficacious as competition itself, will keep down the price of the product to a point which will return to the capital, no more than a fair compensation. When the copper trust raised the price of copper until it returned more than a fair margin of profit on the capital invested, another copper trust was formed, and the monopoly in copper was straightway destroyed. I rather incline, therefore, to the views of that class of economists who believe that when the incidental evils, such as discrimination, secrecy, over-capitalization, boycotts, etc., have been provided against, the question of monopoly will not be a serious problem of the trust.

Now, there are certain evils, incident to aggregated capital, whether it be in the form of large partnerships, joint stock companies, corporations, or trusts.

And among these evils are, (1) The ability of the large shipper to secure a discriminating rate, or what amounts to a discriminating rate of transportation; (2) The ability of the large dealer to temporarily discriminate in prices until local competition is driven out, and to boycott rivals by offering an extra profit to customers who will handle nothing but the trust product; and (3) the absolute secrecy which shrouds the books and acts of the corporation or trust; and (4) the practice of over-capitalization, or "watering stock."

I am not one of those who believe in legislating against natural laws, and I believe that the laws of trade are quite as irresistible and quite as much above the commands of a legislative enactment, as the laws which govern the motions of the planets.

But the incidental evils which I have called to your attention, as likely to accompany the formation of trusts, are not laws of trade, but perversions of the law, invented and carried out by men for their own selfish ends.

Many of these evils, if not all of them, may properly be made the subjects of legislation, and an enforcement of wise laws, passed in this behalf, will, in my judgment, do away with them to such an extent at least that they shall cease to be threatening.

If I am correct in the views which I have expressed to you, then the truth about trusts is found somewhat close to the assertion of John Stuart Mill that "when markets are large and a large opening for exportation, large systems of business are effective. Large establishments are substituted for small ones. This change from small to large is wholly beneficial. It may have some drawbacks,

but when once the system of large establishments is established, the change from large to larger systems is an unqualified benefit."

The trust properly organized—that is, not over-capitalized—and prevented as it may be by wise legislation, from obtaining discriminations in its own favor, and against its competitors, with its books open to the proper authorities at all reasonable times, is a wise and potent combination to increase the development of the country, and enlarge its material prosperity by widening and extending its markets, and whatever makes for the general welfare, is pretty apt to make for your welfare and for mine.

I have spoken to you, thus far, of trusts, as aggregations of capital, and that is not only in strict accord with the definition of the lexicographer, but it is the popular and generally accepted idea.

I may say to you in passing that trusts are not confined to capitalists, and that the great labor organizations of the country, like the Amalgamated Association and the United Mine Workers, are to all intents and purposes, upon the same lines, and calculated to bring labor the same beneficial results, that the associations of capital are supposed to bring to the allied corporations. They, too, have their evils and abuses, which it is not my purpose to bring to your attention, and they, too, are quite as susceptible to defense, and indeed to commendation, as the trusts of their employers, when managed honestly and for the purposes for which they were created. They recognize the principle that competition in labor is not life to the laborer, and by restricting competition, within reasonable bounds, and protecting the laborer against unwarranted or unjust attacks on the part of the employer; controlling apprenticeships, and regulating the hours of employment, etc., they have helped to make him, what we are all proud of, the most efficient, and the best paid workman in all the world.

I bring these things to your attention to show you that the value of trusts is recognized not by capital alone, but by labor also, and that they are quite as efficient, offensively and defensively, for the workingman, as they are for the millionaire.

It may be true that the existence of the one requires the existence of the other, but be that as it may, the fact remains that in the last thirty years, during which both have sprung up, the average of wages in this country has risen sixty per cent., and the cost of living has steadily decreased.

According to the Bureau of Statistics of the Treasury Department, the iron and steel trusts will send abroad in this year of our Lord 1899, more than a hundred millions of dollars' worth of iron and steel—\$20,000,000 more than they sent last year, and this in the face of advanced wages to their workmen, and increased cost of material.

Just how trusts will affect the farmer, I say to you frankly, is not entirely clear to me. No less eminent authority than Mr. Havemeyer, in his testimony before the Industrial Commission, seems to be of the opinion that it will cheapen the raw material. Now, while I can understand that Mr. Havemeyer, one of the so-called sugar kings, might be of opinion that sugar as a raw material would be cheapened by the sugar trust—because it is a product directly affected by that trust—I am at a loss to understand how anything which you, as general farmers, might grow, could, except indirectly, be affected by combinations of capital in no way dealing with your products.

I assume, now, that there can be no farmers' trust—no combination to restrict the production and control the prices of farm products. The interests are too numerous and diversified, the markets too broad, the opportunity for easy competition too great. If, then, the price of your products is not cheapened by the trusts, and your production is not restricted, and your markets are not narrowed, I cannot see how you can be harmed in these respects.

On the other hand, if the outcome of the trusts is to cheapen the things you buy—your oil, your sugar, the machinery with which you till the soil, the clothes which you wear, the books which you read, and the things with which you adorn and beautify your homes—in these respects, at least, the trusts are a benefit to you. No matter what may be your fears as to the result of this problem, I beg of you to examine the matter carefully, and without apprehension. Do not permit your minds to become biased with the idea that the trust is a great octopus, with its arms stretched out to throttle industry.

Such a state of affairs could never exist in this country; and if, in the development of industries, it should ever transpire that the fears of the alarmist were realized and the trusts should really become the blood-thirsty monsters which they are depicted, the free people of this "government for the people and by the people" would rise in its wrath and wipe them off the face of the earth.

I have no more fear that this will ever happen than I have that the alarmist will be able to turn backward the hands of time, and put us once more in the age of the stage-coach, and the sailing vessel.

Trusts are the natural result of industrial evolution, and, properly controlled, and fairly protected in their legal rights, along the lines of our experience, prosperous as we have been, and prosperous as we are, they will carry us forward to still greater prosperity.

PUBLIC ROADS.

By C. H. RICH, *Woolrich, Pa.*

Public roads, the annihilator of distance, the great channels that bring the commercial interest in close relation with the marts of the world, and is the solution of stagnation in commercial centres. It is a civilizer as it brings the dark recesses of a country in close touch with the sciences and business commerce of enlightened lands.

The permanent highway is one of the prime features in our present commercial system. It is not only the advance agent, but a builder in the formation of civilization. In all ages the extent and condition of the highways have been the measure of prosperity and power of the people or government. It is true, to a certain extent, that steel supplants the primitive dirt road in binding the widely separated territories, while the more closely connected communities are linked and made more practicable by a good, permanent road-bed for the use of vehicles; this means is preferable and more economical than steel and steam, which open to a more profitable use the varied resources, otherwise will lay as dormant as has been the experience of the past centuries that have not availed itself of this pre-eminently potent factor, and which constitute the most striking proof of an onward march in advanced civilization. For these and sundry reasons, the subject of permanent roads, must and is not only beginning, but is far advanced, and shows in a parallel ratio quantity and quality of permanent roads with prosperity and civilization all inter-dependent.

It is no longer a question of doubt that no single influence has done more in the developing of the United States, as railroads, in conjunction with good public roads, since the public roads are the feeder of steel roads, which coming universally perpendicular to and forming necessary tributaries, as well as feeders to the railroad, public roads are hence the beginning and ending of every general railroad system, to a greater or less extent.

Inasmuch as the river Gurudi divided the Gauls from the Helvetians, and separated all business relations, so are countries separated from each other by either natural causes, as mountains, rivers, forests and distance. Then the dire disasters culminating, aye revolutions themselves, with strange relations, are all more or less attributable to the want of better public road system.

What of the rebellion? History and fact will bear well on the point.

Famine, floods and tornadoes are caressed by the great arm of public road system, and their agonies, distresses and despair are alike alleviated, rocked to sleep by the close, sympathetic touch of the more favored brother who is not encumbered by transportation facilities in supplying the wants at once through these distance-annihilating channels of good roads.

Not only this, but it is a tax raiser, as it enables you to reach the markets when goods and grain are wanted, and not after the market has been closed. It is a bond lifter, as it is time saved in traveling (time is money, if properly employed), that can be utilized to a more advantageous employment on the farm or in the shop.

Who would not go with the farmer in his dreams, as he passes down the public highway, level as the floor, viewing the verdant fields and inhaling the aromatic sweets of a thousand flowers? Health, with its ruddy glow, pervades his face, as the light of day dispels the darkness of night. Behold his two horses which skip as lambs, behind that farmer's former six-horse load on bad roads, now chaffing the bit in high spirits under the improved system.

PUBLIC ROADS AND HOW TO IMPROVE THEM.

To take out the hindering causes to successful, permanent road building, if we succeed on these points, we will have reached the goal of expectancy.

Do you see that man traveling yonder? Let us drive slow as we pass. Yes; I notice the feline curvature of his vertebrae; his head hugged between his shoulders like an owl—his horse has stopped—the driver moves slowly out over the front wheel, climbs down the spokes like a chicken thief on a ladder—he reaches the ground—then, with one finger wipes the dew-drop from the end of his nose—he walks back toward the rear end of the wagon, gets out a three-foot two-inch stick, with a six-foot four-inch lash, moves front and assumes the position of a horse trainer. With a few cuts of the whip the horse again starts—the man now walks along the side of the wagon with his left hand on the right side of the wagon bed. I notice his hair of a dark dusty color, hanging in strings or tassels about his neck and ears—that old, greasy hat, with a dinge in front and a ragged hole at the side, which looks like the ragged edge or armor plate of an American vessel blown up by a Spanish torpedo, affords the head gear. As he walks along, I notice his face—brown, dirty and greasy, and strubbly whiskers protruding therefrom. He has a brown pair of overalls on, one leg with large ragged hole at knee, the bottom in frills and six inches from his unbuckled shoe top, while the other seems to be fairly good, reminds me that

the storekeeper must have shown him only the one leg of the overalls over the counter to sell by, and the other kept towards himself to make profits on; but, notice his strange movements, as he puts the whip inside the wagon; one hand goes down in his gray, bleached and greasy coat pocket and brings up the bowl of a clay pipe, four years and nine days old; by the dark shade and pungent aroma of several weeks older still, the stem, one inch in length is put in his mouth, after the bowl has been filled with "pull down shed navy." It is then adjusted so that both nostrils will come over the bowl of the pipe; this will now afford the proper economy by utilizing all the escaping gases. He now reaches again for the whip to take the place of the dinner the horse has missed, by being six hours on a road, in accord with the driver's views, but only two and a half miles long. I notice the cracker of the whip as it strikes the old collar, and eleven strands of different length fall to the ground. What about the horse? Not to go into detail, as there are many fine points for an anatomist to reflect upon, and has nothing to do with road condition, only the effect of some cause—neither has the wagon—but let us look at it. It has three wheels of an antediluvian pattern; one borrowed from his neighbor Jones, three and a half miles distant, the tire of which is half set on and half set off. The figure that it cuts on the ground is of a parabolic nature. The hubs of the three wheels project so that three turkeys could roost without being crowded on each hub, and in fact looked as though it had been kept for that purpose. But the apparent image of the man, the chief arbiter and controller of our road; I see him yet, with his mouth stretching across the wide desolation of his face, a fountain of falsehood and sepulchre of ruin. His family consists of a baker's dozen, two girls and eleven boys. Election is on—a supervisor to be elected. We vote for economy; we vote for mud trough and dust trails. These require no taxes, no pride, no brain, no religion, no law, no nothing. We are nothing and a nothing is elected.

Q. E. D., he carries out his constituent's wish, by perjuring his soul when he say by solemn oath that he will keep the roads in a passable condition and easy of access at all times and at all seasons of the year. No religion, when he care not for the life of beasts of burden. No pride, the demoralized condition tells for itself. No brain, as they would certainly show in judgment exercised. Now, fellow citizens, "when the foundations are gone, on what shall the structure be builded?"

We have tried to show you very meagerly the real condition that confronts us in regard to improved public roads. Who are you going to vote for at the spring elections, with the gang of fellows whom I have just described, who are ruinous to the best interests of society—anarchists opposing all public interest. Good roads

must be built on scientific principles.. You can no more build good roads with fools and idiots, than you can run Republican form of government with the same element, and it will be just in proportion to the amount of intelligence shown—a fountain cannot rise higher than its source, neither can the reform of a party be greater than its constituents.

This has been verified in political affairs. It is verified in township public road affairs to-day. What is more preposterous than to assume that a man who all his life never earned over one or two hundred dollars a year and never ran any more business than a pick and shovel be elected to the office of road supervisor to lay the number of mills of tax. Collect same and squander three or four thousand dollars of the people's money annually in a vain attempt to patch dirt roads, when if judgment were exercised over townships that are now in apparent bankruptcy, would to-day be among the civilized and prosperous portions of our land, again, as the telephone and telegraph connect distant lands in thought, the roads convey and carry out the purport of the mind. As money is a medium of transmitting the values, so is a good road a medium for the transmission of commerce and is the ultimate means and end of interlocking mind, money and commerce: These three great forces without the *modus operandi* of good public roads would be paralyzed and utterly fail and is operative only in proportion to the means afforded. Then educate the masses that the highest possible results be obtained; with education the greatest amount of enjoyment is obtained. He lives most, who thinks most and enjoys the labor of his thought. The great advantages to be gained shown in figures are so stupendous that we at this time have refrained from compiling as they have been given on a former occasion, and seen useless until we can comprehend our real position, and resort to the means to help ourselves, namely the ballot. Vote for our land's improvement, our home's improvement, and God, as he is in the scientific road, a principle that alleviates the condition of his created beast, and the highest possible enjoyment of mankind.

PAPERS SELECTED FROM THOSE READ

BEFORE THE

STATE BOARD OF AGRICULTURE,

AT THE

JANUARY AND JUNE MEETINGS, 1900.



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LIVE STOCK IN WESTERN PENNSYLVANIA.

By J. S. BURNS, *Clinton, Pa.*

During recent years the live stock industry in this section of our State has undergone a very great change. Electricity has supplanted the use of a great number of horses about our large cities, and that, too, a class of horses that were of little use in other lines of city industries. We refer to the "chunks" that were used by street cart lines. This left in the hands of the producers a vast number of this class of horses, and they in turn had their effect upon other grades of horses, and the result was a glutted market. Producers, as a class, quit breeding horses, and to-day young horses of good quality are exceedingly scarce and command remunerative prices. Of course, that class that was so rapidly worn out by street car lines does not meet with much inquiry, except for farm purposes, and that largely because of their low price. But the massive draft horse of symmetrical form, for city teams, and the high stepper, with arched neck and good spirit, for the man of wealth or pleasure, are in good demand, and command paying prices; but they are not here, and few in sight.

A few years ago a great many of our farmers would, once or twice a year, drive a number of fat cattle to the Pittsburgh market and sell them direct to the butcher, receiving the full return for their product. But later a change was wrought, and if the farmer sold his cattle on the market at all, it must be done through the agency of a commission man. And the farmer who thought to dispose of them otherwise would soon realize that a combination of forces was operating against him, and sooner or later he would find himself "froze out" and completely at their mercy. Next came the birth of the dressed beef combine, and the farmers, feeling themselves handicapped on every hand, became discouraged. And this, with the opening up of many railroads, caused many of them to turn their attention to dairying. And the great numbers who embarked in this business

eventually brought the price of milk below the cost of production, and by the fall of 1899 many dairymen had decided to dispose of their herds; and some had already done so, when a sudden rise in the price of milk turned the tide, and at present it is bringing remunerative prices; and milk dealers have runners out in many sections soliciting milk supply.

About ten years ago wool began a downward tendency, and so continued until 1896, when it reached a rock bottom of 10 cents for unwashed, and 15 cents for washed fleece, per pound. Of course, there was no money in sheep under these conditions and husbandmen, almost with one accord, placed their flocks on a glutted market and disposed of them at ruinous prices. In some cases, even as low as 50 cents per head for very fair quality of sheep. These men turned their attention to the other lines of farm productions, and largely to the dairy, because at that time, cows were high, and dairy products commanding remunerative prices. A few of the more prudent, however, retained their flocks, carefully culling them from time to time, and disposing of the refuse. And in some cases, the older and larger ewes were bred to a ram of the mutton breeds, and the lambs sold to the butcher. Another feature of the case, has been the springing up of numerous railroad towns, and of course, a dog is a very necessary adjunct to a village home; and they so frequently have wrought depredations among the flocks of the country that husbandmen often declare they will have to abandon sheep raising entirely. It is true, our State laws, of more recent enactment, afford some relief to the farmer in making good his loss; but it does not save the life of his sheep when a lot of hungry dogs get among them. Besides, it is scarcely possible to estimate the actual damage to a flock of sheep that has been worried by dogs. As a rule, the farmer would be better off to destroy the flock and dispose of the pelts. But the reaction in wool, so long looked for, and so slow to come, is at hand, and in spite of these adverse conditions farmers are glad to secure high class breeding ewes at from \$4.00 to \$5.00 per head. And farmers anticipate receiving 40 cents for their wool in 1900.

In the swine industry there has, perhaps, been less variation in breeding, relative to numbers, than in other lines of live stock; and largely because each crop is marketed, in turn, regardless of the condition of the market, thus making room for the next. There has been a decided decrease in the number of young swine wintered each season; farmers realizing that there is more profit in young, early maturing swine, placing the spring crop on the market the following fall. Besides, the demand of the market is, largely, for a smooth, fleshy made pig weighing from 175 to 225 pounds live weight. And March or April pigs can easily be made reach this

weight, and if desired, be marketed before Thanksgiving, which for the small grower, is the better thing to do, as poultry will, to a great extent, supplant the use of pork, from this until after holidays.

Poultry in all its various branches is grown in this section of the State to considerable extent; and usually finds a good market. But the amount raised in sections adjacent to our large market centres would be inadequate to the demand were it not for the vast numbers shipped from other localities. As we gaze upon the tons of poultry found in the Pittsburg market during the holiday season, we naturally inquire, What will be done with all this? But it is all disposed of and room made for more. And here, again, early marketing is essential on the part of the farmer and small grower. And in this connection the condition of the Ohio river becomes interesting. A rise will bring boat loads of poultry from points below, and they are dumped upon the market, often causing a glut for the time being. And if a good stage continues, it will have a depressing influence upon the market. Hence the importance of local growers marketing early.

OBSERVATIONS.

From much of the foregoing, the old and trite conclusion is again forced upon us, that no class of people is more given to rush from one branch of our industry to another than we Americans are. At a time when one line of our products is depressed and yielding little more, or perhaps less than the cost of production, some other commodity is enjoying a lucrative period. Then there is a rush from the one to the other, irrespective of the cost. And we are sure to abandon the one at a sacrifice and equip for the other at boom prices.

We are aware that our worthy Secretary of Agriculture is an advocate of specialties, and we have all respect for his good judgment, yet we are constrained to say, that in our experience a system of mixed husbandry is better adapted to the wants of the ordinary farmer than specialties. There has never been a time when we were not able to realize fair prices from at least one commodity and thus relieve the stringency of our money supply, and perhaps enable us to hold some other product for a better market. But we are compelled to recognize the fact that not every one can divide his attention among many lines of agriculture, either from lack of taste or qualifications. So, first of all, it is important to carefully study ourselves, and know what we are fit for. Then carefully study our business, and pursue it with as high a degree of intelligence as we can command, and not neglect to cultivate good staying qualities with ourselves.

During the recent years of depression, there was never a better

time for farmers to stock their farms with animals of high merit, for at one time or another they have been available at prices seemingly within the reach of any farmer; yet it is surprising how few embraced the opportunity. There has been greater improvement in swine, poultry and sheep, in the order named, throughout this section, than in horses and cattle. It is not uncommon to see a herd of smooth, even-bred hogs, or a flock of poultry, uniform in color and breeding. But among our cattle, with but few exceptions, and especially our dairy herds, every color and size may be seen. And now that beef cattle are coming into repute, some would fain persuade us that a Jersey steer is as good for beef as a Short-horn and would have us waste our time, energy and feed, and then destroy our powers of mastication and regard with distrust everything that comes from the butcher's block. The facts are, good feeding steers cannot be secured from home producers.

And finally, amid all this struggle and turmoil, farmers have stemmed the tide and lived through it all; and, to the best of our knowledge, none have passed from this great stage of action through the agency of want or privation. And the well-to-do enjoy conveniences and advantages unknown to some of us when young. Carpets cover the floors, pictures hang upon the walls, musical instruments supplant the spinning wheel and knitting needles. And we rejoice that such great changes have, and still continue to come. There is no class of people deserve more of the good things of this life than do the farmers. There is much to be deplored; many things that need correction; but it requires the dark to add lustre to the bright side of life. And, after all, this world is not such a bad place to be, and some of us will undergo a very radical change of mind, if we leave it a moment sooner than we can help.

FLORI-CULTURE AS A PROFESSION.

By EDWIN LONSDALE, *Philadelphia, Pa.*

Flori-culture is a branch of horticulture, and horticulture is a branch of agriculture, and agriculture is the foundation of all industries.

It is somewhat difficult to determine just where horticulture begins and agriculture ends, so closely are their interests interwoven. The farmer is more or less interested in horticulture, and the gar-

dener is more or less interested in agriculture, and flori-culture lays claim to its share of attention also.

While agriculture is the oldest among the professions, and horticulture comes in a good second, flori-culture is possibly the most recent of all. Everyone connected with any of these three professions, however, can without hesitation be pronounced tillers of the soil.

Our grandfathers and grandmothers would have scouted the idea of offering for sale their beautiful and fragrant blossoms, though as gifts nothing would be more freely given or better appreciated or give more genuine pleasure; but to barter them for gold or silver would to them have been sacrilege in the extreme; and as nothing is so appropriate for gifts as flowers and gives more pleasure, and because everyone who desired to have flowers to give and could not have them without buying, was, in this commercial age, the foundation of flori-culture as a profession.

Twenty-five or thirty years ago nearly all the retail flower stores in Philadelphia had a greenhouse establishment of their own for growing cut flowers for sale, and when additional flowers were needed, the retailers often found it necessary to buy from each other or from greenhouses in the suburbs; and the gardeners and proprietors of amateur establishments were frequently tempted by coin to help out when the demand for flowers was superior to the supply.

The greenhouse establishments in the suburbs of Philadelphia in those days, where cut flowers were more or less a specialty and where the florists yet did a general retail business, found after a few years' experience that the wholesale part of their business, where they disposed of their surplus among the city retailers, was very much the most satisfactory. And that was the cause of establishments being started about twenty years ago, both outside and inside the city limits for the purpose of growing cut flowers to sell exclusively at wholesale to the city retailers, and since that time numerous places for the same purpose have been started, which have met with encouraging success.

It was found that where a retail and a wholesale business was conducted jointly there were confusions. When the suburban greenhouses needed the most flowers, the city florists could use them in greater numbers also.

About the time stated above, namely, in the year 1880, many flowers found their way in regular shipments both from New York and Boston, but at the present time there are more Philadelphia grown roses sold in Boston than there are Boston roses sold in Philadelphia. Boston and New York were both in advance of Philadelphia in the production of cut flowers in those days, and possibly they are today in many respects. The growers for both those cities have a distinctly different way of disposing of their flowers at wholesale than

they have in Philadelphia. For instance, the majority of commercial florists growing flowers to be disposed of among the retailers in the Quaker City have their own salesmen, and some of the proprietors even sell their own product, delivering the flowers at the different stores daily; whereas, in both Boston and New York wholesale markets are established where the retailers buy early in the morning what they expect they may need during the day.

It is only a few years ago that nearly every florist built his own greenhouses. He was a carpenter, steam fitter, painter, glazier and florist in combination, and the materials used in the course of construction were of the very cheapest possible character. He tried to cover as much ground with a given piece of glass as possible, and in many cases it was questionable economy, though, as a rule, in those days it was the only way open for an ambitious young man, with very little cash capital, to start into business for himself.

This is certainly a commercial age, and the rapid development of the business of flower growing for sale has been enormous, almost beyond belief during the past few years. In the ages to come, when an adequate history of the development of commercial flori-culture shall be written, it may be made to appear as though it had almost sprung up in a night.

It seems only the other day that a greenhouse one hundred feet long was considered the correct and extreme length practicable in which to grow plants and flowers, but a week or two ago in the flori-cultural trade papers there were illustrated articles published, giving plans, etc., of two rose houses in course of erection in Natick, Mass., seven hundred feet long. It would seem that now surely the limit had been reached, but when we realized that in comparison with the days (only a short time ago) when greenhouses were heated by what is known as the old-fashioned flue system—which means that a fire was built in a furnace at one end of the greenhouse, and terra cotta or glazed drain pipes of suitable size, or brick flues, were used to conduct the heat and smoke to the other end, and that heat sufficient would sometimes be radiated in transit, or en route, so to speak, to keep out frost and incidentally to grow plants and flowers for sale—that to-day we hardly know what is in store for us, or what to expect in the future, especially when we consider how electricity has displaced the horse in methods of transportation on the streets of cities and towns and upon the country roads; then, why may not electricity be applied in some of the routine and laborious work necessary in a large establishment where flowers are the staple articles grown?

The primitive method of heating plant-growing structures above referred to was only once removed, as it were, from the window garden of the dwelling-house.

The window gardens of our great grandmothers were the forerunners of our modern up-to-date steam heated greenhouses of to-day, and woman was the first to assume the care of plants and flowers in an artificial way. They would take up in good time the sensitive exotic, and tenderly care for it long before the chilly north-west wind swept o'er the snow clad hills and breathed the frozen tokens of nature's enforced rest.

The rapid development of flori-culture as a profession is largely due to an organization known as the Society of American Florists, and to the trade journals which as a consequence followed in its wake. The S. A. F. meets in convention in a different city in the month of August for three or four days every year, and papers appertaining to flori-culture and discussions thereupon form the greater part of the proceedings. It was organized in the year 1884, for the purpose of developing commercial flori-culture and bettering the condition of florists, as the Farmers' Institutes, State Boards of Agriculture and U. S. Department of Agriculture, and kindred organizations were originated for the purpose of benefiting the farmer and improving agriculture.

Farmers and florists have some things in common. The results of their labor and skill are the products of food for plants. Phosphoric acid, potash and nitrogen are just as necessary and essential to produce a crop of flowers as they are to produce farm crops. The farmer has an advantage over the florist to a great extent. Special fertilizers are prepared for him for the various crops he grows; whereas, the florist is largely in the dark in this respect at the present time. Much money is annually wasted by florists, I am sure, in the purchase of fertilizers. Bone is one of the most popular fertilizers with them, and its chief ingredient is phosphoric acid, but whether it is as essential as a plant food to the production of flowers as it would be where a crop of seed, as corn, or wheat, or any other similar crop, where grain is the object in view, is a problem not yet solved. Potash, as used by the florist, is furnished through wood ashes principally, and the bulk of the nitrogen comes from farmyard manure, that from the cow stable at the present the most preferable. Nitrate of soda and sulphate of ammonia have to be used with great caution, for so much damage has been done to crops in the past under glass through the indiscriminate use of these salts that in many establishments the use of them has been abandoned entirely. This state of affairs has been brought about largely through the erroneous idea that because a small quantity of the essential plant foods should prove beneficial, a larger quantity ought to prove more so.

The Florists' Hall Association is an offshoot of the parent society,

and would not have been organized, nor could have been operated successfully had not the S. A. F. been at the head of it.

I have no means of knowing how many feet of glass in this country there are devoted to the growing of flowers, but up to August 1st, last, 11,209,865 square feet of glass were insured in the said association. It originated among the florists and is managed entirely among themselves. During the past year claims for losses by hail have been paid amounting in the aggregate to \$5,337.39. It is understood, of course, that all the glass devoted to commercial horticulture is not insured in this very useful association, but it is rapidly becoming more popular on account of its excellent management and by the prompt payment of losses after they have been reported and duly verified.

The Chrysanthemum Society of America is another offspring which has done good work. The nature of its duties, so far, has been confined to the protection of the buyers of new Chrysanthemum plants from purchasing novelties of the popular Queen of Autumn of doubtful value. Committees are appointed annually to meet once in each week during the chrysanthemum season in the larger cities, as New York, Boston, Philadelphia and Chicago, and to examine seedlings or sports. No less than six flowers must comprise an exhibit, if to be considered by the committee. Two dollars is the entrance fee, and this has the effect of simplifying the committee's work, for no matter how enthusiastic the owner of a new variety may be, he becomes immediately critical of his own production when cold cash must accompany his entries for exhibition. These new candidates for public favor in seedling chrysanthemum are judged according to a scale of points, and when eighty-five or more are awarded out of a possible one hundred, a certificate of merit is granted by the society.

The American Carnation Society is another child of the S. A. F., and is run upon somewhat different lines than are those of the Chrysanthemum Society. An annual meeting and an exhibition of new and meritorious varieties of carnations is held in connection therewith the third week of February in the different cities. Last year it was held in Philadelphia, where this society first saw the light of day in the year 1891. This year it will be held for the second time since its organization in Buffalo, N. Y.

Wonderful strides have been made in the improvement of the carnation since the society was organized in the Quaker City in the year as before indicated. Thirty-five cents per dozen was the prevailing retail price in those days, but during the past year the new Boston variety, "Mrs. Thomas W. Lawson," led in price in that market at \$9.00 per dozen. The premium price, however, has been reached by a variety which so far has no other name to designate

it from other varieties than "The Three Sixes," (or No. 666). "The Lawson Pink," which the Boston variety is commonly called—which, by the way, is cerise in color—was boomed into prominence largely by the name which was given to it, namely, that of the wife of one of Boston's leaders in social and financial circles, which in itself ordinarily would have been thought sufficient to attract public attention; but other superior business methods were made use of in bringing it before the public that has enhanced its value until orders for plants during the past three months have aggregated the enormous number of three hundred and fifteen thousand (315,000).

It is stated on authority which cannot be disputed that \$30,000 was paid to the originator of that variety for the entire control of the output of both flowers and plants until the end of the year 1900 of this famous "Boston Pink." The purchase money has already been secured even if the average price was only ten cents per plant. By referring to the advertised prices, quantities of 5,000 and over have to be ordered before so low a price as ten cents each have been conceded.

The time for the dissemination of plants of the New York variety, known up to the present time only as the "Three Sixes," or No. 666, before referred to, has not yet been decided upon, so that the fixing of the price of the flowers is entirely in the hands of the owners. At the present time it is selling wholesale in New York city at five dollars per dozen. The first five dozen, which were sold to a retail florist in that city, were disposed of at retail a few moments afterwards for sixty dollars, or at one dollar for each flower! Not such a bad price for carnation blooms.

A florist cannot protect his floral productions by patent, no matter how meritorious they may be. When he once sells plants of a new variety, he at once puts the purchasers thereof in direct business opposition to himself, giving opportunities to cut prices if they feel so disposed.

Philadelphia has no phenomenal varieties among flowers at present which it can claim as being its very own, and in which no other city can share its glory, but the Quaker City has the distinguished honor of being the first city to start the upward tendency of prices among fancy carnations, when the variety Helen Keller sold at retail in the year 1894 at \$2.50 per dozen. Immediately prior to that time \$1.00 per dozen seemed a very high price, even for the most select.

A Rose Society now seems to be assured of ultimate success, after various ineffectual efforts to establish it. It deserves the sympathy and support of every commercial florist in the country, for the rose is the queen of flowers, and has had more influence in elevating the profession than any other one flower, or, I may say, than all the

other flowers combined. It was the bright, crimson and fragrant rose General Jacqueminot—commonly called “Jacque”—which first sold at what was considered at that time extravagant prices among flowers. When it was first offered for sale in the winter season all that was asked for it was \$1.00 per dozen, but a genius with the commercial instinct highly developed quite commendably succeeded in bringing the price up to \$2.50 each.

At the time of the first convention of the Society of American Florists held in Cincinnati in 1884, a trade paper was born, and the society and the said trade paper have been going hand in hand ever since, and have had a wonderful effect in developing commercial flori-culture. The paper to its stockholders was a paying venture from the start, a substantial dividend annually being declared, and continued doing so even after a rival entered the field. And within the past two or three years another and a third weekly publication devoted to commercial flori-culture has been started. While the stockholders in these weekly publications may not be making much money in their enterprise, the profession at large and the public indirectly are reaping the benefit therefrom, because each paper is trying its utmost to give the best possible service for its respective subscribers for the price of its year's subscription.

A year or two ago and for several years past, Begonias could be bought at Christmas for 50 cents apiece. The past Christmas—that of 1899—Begonias growing in the same amount of soil, less than half a peck, were sold at \$8.00 per plant. Some plants of the same variety in smaller sizes were selling as low as \$2.00 each, but none sold lower. In explanation: It was not so much that times were better than last year to warrant the increase in price, nor was there much difference in the method of culture, but it was the offering of a new and very meritorious variety that caused the difference in price. The variety referred to is of French origin, and is a cross between two distinct species, namely, Socotrana and Dregii, and it is so nearly what may be termed a mule in flori-culture that seed-bearing flowers are very rare indeed; so much so that instead of forming seed it goes on producing beautiful pink mule flowers in vast numbers, and remaining cheerful and bright much longer than it would do if the usual number, for begonias, of seed-bearing flowers were produced. I may state in passing that there is what is well known as male and female in the floral kingdom as well as there is in the animal creation. In some families of flowers the male and female organs are complete in the same flower, though in the begonia the male and female flowers are distinct and separate individuals.

Flori-culture has become firmly fixed as one of the recognized industries, and will continue to be so for all time; but the difficulties

to succeed will grow greater with each succeeding year—especially does this apply to the grower of flowers. It is not only necessary to know the necessities of plant life as thoroughly as it is possible to know them, but it is also necessary to have a thorough business training, with the commercial instinct well to the fore, and an abundant amount of executive ability to carry out every essential detail in a growing establishment to a successful conclusion.

The retail florists in the larger cities are aristocrats in their bearing and methods, with their tastefully embellished delivery wagons, their automobiles or teams of high steppers, and with their assistants in livery, emulating that which is worn by those occupying similar positions with their customers; all of which has been brought about within the past ten years by superior business ability, and by being strictly abreast of the times.

An intelligent, well educated boy raised on a farm and who is not afraid to work and has the right stuff in him to make a good farmer will make a first class florist. Some of the best and most successful florists to-day are those who were raised on a farm.

Many of our most successful florists have the commercial instinct more highly developed than they have an innate love for flowers, and this essential characteristic for commercial purposes must be more pronounced in the future than it has been in the past, because the competition is sure to become keener. Well do I remember the time when it was stated with great assurance that no person who had not a natural and real love for flowers could ever succeed as a grower thereof. This may have been true before commercial floriculture had assumed its present proportions, but it is not true to-day.

A "rosy-pink" view of flori-culture, as a profession, has been in some degree attempted. It must not be understood, however, that there is no "yellow" or "blue" side to the business, because there is, for no glass that is made has yet been sufficiently annealed to make it elastic or pliable enough to yield gracefully without a fracture to the pelting force of a vigorous hail storm. Nor can the structure be so well built as to withstand the tempest. The adverse elements in a few minutes could destroy, and have destroyed frequently, what a florist had spent his whole life in accumulating.

PROGRESSIVE POULTRY RAISING.

By HON. NORRIS G. TEMPLE, *Pocopson, Pa.*

A gold mine, if worked successively, will finally cease to produce. So to-day it is with many of our farms; they have been overworked and as a natural result have ceased to be as productive as they once were. This condition has forced many general farmers to specialize; some have taken to stock raising, others to fruit growing, many to dairying and market gardening, and a few to raising standard bred and market poultry, while a large number are combining two or more of the foregoing. It is highly probable that not one man out of every hundred you meet in the daily walks of life has any idea of the magnitude of the poultry industry of this county, and the money making capacity of the much berated hen.

The time has passed for profitable poultry raising by haphazard trust-to-luck methods. In the good old days, fowls were a by-product of every farm and village establishment. Eggs chosen at random were placed under the most accommodating old hen. To-day, poultry raising is a practical, scientific business proposition; nothing is left to chance; every point from the selection of breeders and proper food to the final market is made a matter of thoughtful study.

A building for shelter, not necessarily elaborate, but which is dry, warm and light, preferably with windows to the south and direct sunshine during as much of the day as possible. These conditions are essential to health and success; if the hens are confined to any great extent, there should be provided an open shed facing the south in which a liberal supply of cut straw or fodder is constantly kept.

The rock upon which many a poultry venture has been wrecked, is impure air. Fowls domesticated are, from excessive in-breeding, much more susceptible to disease than fowls in a state of nature. An inadequate supply of pure air intensifies this weakness until the stock becomes debilitated and the eggs produce chicks that no amount of coaxing can induce to live.

An article on selection of breeds and on breeding contained in *Farmers' Bulletin No. 41*, covers this important ground. A mistake is oftentimes made in selecting fowls of a breed that is not suited for the purpose for which they are to be kept. If egg production

is the all-important point, it is a most serious mistake to select a breed of fowls that is not noted for this product. If, on the other hand, meat is the chief object, an expensive mistake will be made if any but the heavy bodied fowls are chosen. The small, active, nervous, egg-producing breeds cannot compete with the larger Asiatics for meat production. Then, too, if fowls are kept for both eggs and meat production, some breed of the middle class should be chosen. These, while they do not attain the great size of the Asiatics, are sufficiently large to be reared profitably to supply the table with meat, and at the same time have the tendency for egg production developed sufficiently to produce a goodly number of eggs during the year. The Wyandottes and Plymouth Rocks are good illustrations of this class of fowls. It is one of the most profitable practices among poultry raisers to cull out the stock for winter. Keep all the best layers that are not over one year old and select your largest and best developed pullets. It is not the number of hens that are kept which tells the dozens of eggs that will be sold. A great many females are allowed to remain all winter which do not lay an egg during the whole time; these are the ones that keep down the dividends. It often seems to be a hard provision of nature that our hens should lay plentifully in summer when eggs are ten (10) cents a dozen and go back on us completely in the winter when eggs are worth three times as much; but the truth is that it is the fault of neither nature nor the hen; the whole truth is, we do not get our stock into proper condition to lay eggs: We are not fair to the hens. If there is one fact established beyond doubt, it is that the fondness of fowls for bugs and worms is not an unnatural taste. The animal matter thus secured supplied a most important element in the fowl's food, and it is largely because the hens cannot procure this food in winter that they cease to lay. In recent years the practical poultry man has been able to double his egg supply in the winter by a careful study of egg producing foods. Prominent among these must be placed green cut bone; a food that is easily and cheaply obtained, and that is undoubtedly the greatest egg producer ever fed to poultry. The bone when finely cut while it is still green, supplies that element of animal food so needed and so relished by fowls; taking the place of the insects which the hen devours so greedily in summer. A perfectly regular system of feeding should be adhered to; nothing, perhaps, is more beneficial to the condition of the fowl. After careful consideration, adopt a system of feeding which best commends itself under the conditions. The fowls will become accustomed to the hours of their meals and will look for them. The morning feed should consist of a mixture of bran, ground corn and oats, equal parts, and a small quantity of animal meal which could be prepared the

night before and allowed to steam; to this mixture may be added chopped clover or small potatoes. At noon scatter sparingly among the cut straw, wheat or buckwheat, and at night give a supply of cracked corn and oats. The above bill of fare, with cabbage twice a week and the liberal addition of green bone with plenty of fresh water will insure a return that must foot up on the right side of the balance sheet, from the sale of eggs alone.

Having eggs from a well kept and vigorous stock, our next thought is to see that they are properly incubated. Too low or too high a temperature, an excess or lack of moisture, tend to impair the constitution of the chicks and may even prevent their hatching. We must be very careful about temperature and ventilation; the latter is the more important of the two, for the reason that through the hen nature has provided a nearly uniform temperature, and in artificial incubation the regulation of the temperature has been about perfected; whereas neither nature nor man has yet succeeded in giving a uniform amount of ventilation. With the hen the amount of ventilation varies with the temperature of the surrounding air and location of her nest; with the incubator it varies with the temperature. In a recent article on care and feeding of chicks, it is stated "whether our ultimate purpose is to secure broilers, roasters or breeding stock, the first steps to be taken are the same. For the first one or two days the chicks must have no food whatever and for the succeeding three or four days they must be fed very sparingly. Nature has provided for the sustenance of the chick for twenty-four hours by the withdrawal into the abdomen of the contents of the yolk-sac remaining unabsorbed at the time of hatching, and feeding too early often results in digestive disturbances." They may, however, from the start have free access to water and sand. When uncared for and allowed to run with the hen, their supply of water is chiefly dew, and their first picking, gravel, sand, dirt and other indigestible objects. This may be considered the natural method, and we can not vary from it. The significant feature of this natural method is that for the first few days, until it has gained strength to forage for itself, the chick gets very little to eat."

What we feed is not so important as the quantity given, although some foods are more nourishing than others. When the chicks are twenty-four hours old they should have hard boiled eggs, bread crumbs soaked in milk, or perhaps what is best of all, rolled oats. They should, when four days old, be taken from the hard boiled egg diet, and wheat and finely cracked corn substituted. Everything about the coop, if hatched by hens, or if a brooder is in use, should be kept clean and sweet, and no more food thrown down than the chicks will eat greedily.

One of the secrets of success in raising poultry is feeding little

and often, say every two (2) hours, until three (3) weeks old, when the meals may be reduced gradually to three times daily; and the chicks at this age should be given all they can eat.

A few chicks together will thrive and grow faster than when crowded. One-half the failures are due to crowding. In a majority of cases the chicks trample the excess of number to death until the minimum is reached, and the poultryman should save them trouble and himself the loss by reducing those together to the lowest possible number in the first place.

The mating, breeding, hatching and rearing of turkeys, ducks, geese and guinea fowls, may very properly be classed with our topic, yet time and space forbid me entering upon them at this time.

PROOF POSITIVE THAT AN INVESTMENT IN SOCIABILITY WILL YIELD A PROFIT TO EVERY FARMER.

By H. V. WHITE, *Bloomsburg, Pa.*

To the careful and candid student there is nothing more sure than that all the forms of life are governed by law. From the lowest forms of vegetable life to the highest intelligences that walk the earth, all are under the governing principle of a law superior to themselves. From a sociological standpoint we may look upon all the diversified phases of human existence as the direct or indirect results of a compliance with the physical, moral and spiritual laws by which the Great Creator has decreed that our lives shall be governed, or on the other hand a lack of conformity thereto.

Man is a social being, and if he would attain to his highest and best he must live in accord with the great plan under which he is day by day permitted to enjoy this life. Every one has learned by observing the common forms of life, that a single stalk of corn in the field, the calf alone in the isolated pasture, the bird confined in the cage, all become puny and fail to fulfil the missions for which they were created. Give to each the surroundings and associations which nature intended they should have and they not only will put on a better appearance, but each will be of far more value. If this be true of the vegetable and animal world, how much more is it true of man.

Who that has given the subject one moment of consideration can

doubt the kind, beneficent and loving purpose and law of that divinity which directs and fixes the course of our every day lives and recompenses our toil and endeavors according to our deserts, ever bringing us closer together and more in accordance with Him, who furnishes the soil we till and gives the needed intelligence to fill our allotted place in the great plan of human economy. We are placed here to help each other. No man can live for himself and by himself and prosper. In that community where there is free intercourse there are marks of thrift and comfort on every hand and the outside world recognizes it.

It very often occurs to me that the chief reason why so many farmers fail to get their full share of comfort out of their homes and their home life is because they live too much within the confines of the farm and the building called the home. They are too selfish and egotistical. Too often they are heard to say, "I have worked hard and taken very little rest. This farm is in better condition and the buildings are much larger and better than when father was living, and what was good enough for father and mother is good enough for me and my wife." Now, he is honest in his opinion; he believes what he says, or the greater part of it, because he has not acquainted himself with his surroundings. If he would employ the leisure that comes to him, in common with all farmers, in visiting in a social way among his neighbors and friends, both in and beyond his immediate community and take his good wife with him, they would see the advances and improvements, and discuss them and adopt some of them, until they would learn that the shortest and best way to success on the farm is by keeping abreast of the times.

While this farmer is thus improving his mind and making his home and surroundings much more comfortable and valuable by his social intercourse with the world about him, he is also learning new methods of farming and feeding, and discovering new and better markets for his products; catching the latest style of dressing his pork and beef for the market, packing his butter, eggs, vegetables and fruit so that they will open up nicely when delivered; and in the multitude of little things never thought of before he is now adding to his comfort, his wealth, and his standing in the community, without adding one cent to the cost of living or production. More than this, by social intercourse farmers learn what variety of corn, oats, wheat and other grain is giving the best results, and seed is procured, one from the other, and the crops are improved without the cost of experiments by each. The same is true of stock. How easy to find a farmer who thinks a cow that yields 125 pounds of butter or the sheep that shears 3 pounds of wool is a first class animal, until he learns that a neighbor, whom he does not consider

any better or smarter than he is, has cows and sheep that produce twice or thrice as much as his at the same cost. It is a revelation to him and would have remained a mystery had it not been for that social call last winter, when for the first time in ten years he had visited his neighbor's home and became acquainted with his family and his methods.

Another has been growing corn, oats and wheat in regular rotation—nothing else—and doing his farming in the most careful and scientific manner. For many years he had a profit each season and was doing well, but of late the balance will come on the wrong side and he has been steadily going back. He has worried and figured and economized but all to no purpose. A friend out the valley who started when he did is still doing well and keeping up with the times, and he decides to go and see him. He takes his wife and they visit for a day—the first time in years. They were received cordially, spent a most enjoyable time, and returned home feeling like different people. The wife talked of the comforts found here and there in the home—all inexpensive but “so nice and convenient.” If they had been subscribers to the *Rural New Yorker* she would have reminded her husband of the “Home Comfort” item in the December number under “Hope Farm Notes” where is so aptly told the story of the old lady who visited the churchyard and viewed the elegant monument to the memory of a friend of her youth and after contemplating its beauty and apparent fitness, solemnly remarked: “I would rather have my monument erected before I die.” She probably could have induced the husband to read further and note that the choice of a monument was “a good range and hot and cold water in my kitchen.” Then that farmer would push back his chair, close his eyes, and picture his wife in such a kitchen, and finally exclaim with H. W. C.: “Now there is some sense in the thought that we should be permitted to enjoy our tombstone.” Rousing himself from his reverie, he would promise to inaugurate these comforts at the house as fast as possible, then he would tell what he saw on his visit. The stables full of young cattle, the pens crowded with pigs, and the coops swarming with fowls—“all growing into money.” The friend had explained that with the changed conditions of the markets he had found it necessary to convert his grain into stock, pork, eggs and poultry to make his farm pay. He declared the experiment to be a success and that he had not only made more money but it gave him ready cash at all times and he found it much more pleasant and interesting than the old way. It brought him in contact with the outside world and gave him a knowledge of and acquaintance with business men and their methods and tactics.

All this was new to our farmer but he found it interesting and made a start at once along the same lines. The first visit was fol-

lowed by many social calls, the intimacy of their young days was renewed, and now that locality counts two happy and prosperous families instead of one. Yes, more than this, for when two men and two women begin to compare notes and make changes in the home and on the farm the neighbors will very soon prick up their ears and call around to investigate. Prompted by curiosity at first it may be, but ere long the social call will take the place of the curious, and good feeling will prevail throughout the community.

Sociability is a part of man's nature. It is a large factor in that law which directs and controls him. Point out a farming district that has a well organized and well attended Grange, a live debating society and reading circle, and a district high school, and you will find neat houses well furnished and comfortable; large barns with stables and sheds for the stock and implements; good stock and equipment; happy and intelligent fathers, mothers and children. The very atmosphere is resonant with the acclaim of success that is patent on every hand, while the heads of the households are regularly investing the surplus to be ready to purchase the farm of anyone who may be so shortsighted as to attempt to go his own way and think this social life "nice but not profitable."

In this age of combines and trusts it has been suggested that the farmers must pool their interests in one vast corporation and hold their products until the market will consent to pay the price fixed. Can this be done? We answer, no; most emphatically, no. Why not? Because the farmers as a class lack confidence in each other and mankind in general, and no amount of argument along the most feasible lines of combined effort would convince the average farmer that you were not laying some skilful plan to trap him and gather in his hard earned shekels.

Yet the farmers are nearer together to-day than ten years ago. They know each other better. Sharp competition has driven them to join hands and unite interest for mutual protection. This has raised the social scale to a much higher level. They read more; they dress better; their children are brighter, more talented, and better educated; they drive better horses, carriages and wagons; they go to the Farmers' Institutes more and more each year; and as they improve their social opportunities they increase their wealth in almost every instance. The time is coming when an organization of farmers will be just as practicable, and when effected, will be just as cohesive as any organized body of men on earth, and, permit the prediction, more honest and humane than the average, because the social atmosphere in which the farmer grew and developed was purer and better. Give us the district high school, with nature's studies and the more advanced branches taught in our cities and towns, the rural free mail delivery to bring the farmers' families

in closer touch with the outside world. In short, educate the farmers socially and our hills and valleys will be dotted with their pretty homes, our markets will be filled with the choice products of their labors, and their coffers will become plethoric with that for which all mankind are so earnestly striving.

If this short paper has failed to convince you of the truth of its text, I trust some thought has been suggested that may encourage you to put forth your best effort to aid in solving this great problem that is of such vital importance to all.

OUR FARM GARDEN.

By R. J. WELD, *Sugar Grove, Pa.*

In presenting this subject to the members of the State Board of Agriculture, I wish to say at the outset that it is presented from the standpoint of a practical dairy farmer who keeps a garden purely for what there is to be gotten out of it towards making the family table more varied and attractive. Farm gardens should be located as near to the house as possible for two reasons, namely: So as to be near at hand when the house-wife wishes to draw from them for the table; and secondly, so that they may be seen every day by the farmer, for of all the crops on the farm, none require closer watching and more thorough cultivation, at just the proper time, than does the garden crop.

Our garden is only 80 feet from the kitchen door, and every part of it can be seen from the house. It slopes to the southeast and is of a gravelly soil, with a hard, stony subsoil. The soil is not what we would consider an ideal soil for a garden, but location and soil do not go together in our case. The garden must be well drained, either naturally or with tile. Our plan is to manure the garden heavily late in the fall, after everything has been harvested, and then plow deeply, thus turning the insects which may be housed up for the winter on top and leaving the ground in a condition to get full benefit of the frost in pulverizing our stiff, tenacious soil.

The turning under of the heavy coat of manure adds to the mechanical condition of the soil, which must be looked after where the same plot of ground is used for a garden year after year. If we had available ground, we would practice seeding down a portion

of the garden every five years with clover and plow that under as a green manure crop. By this means of getting humus into the soil, we would be able to use more commercial fertilizers, thus avoiding the seeding of the garden with weed seeds in the barnyard manure.

As soon in the spring as the ground will permit, we commence to stir the soil, using first, some deep working harrow, such as the spring-tooth, and later, a smoothing harrow to fine the surface. After planting has commenced, a weeder may be used to good advantage.

From the opening of spring until the garden is harvested, cultivation must be thorough and often to keep the weeds under control and the soil in a fine mellow condition and to conserve moisture.

In selecting garden seeds, we find that the best obtainable are the cheapest, and that it is the most satisfactory to depend upon some reliable seedsman for our seed.

Our experience is that by planting everything in rows, running the entire length of the garden and three to three and one-half feet apart, so that we can use a horse cultivator, we get very satisfactory results and lessen the hand work very much. With us, in the northern part of the State, about the middle of April is as early as we can commence to plant.

If the soil is dry enough and the weather warm, at that time, we plant a few early potatoes and peas, planting them in furrows thrown out with a shovel plow, putting in some manure or commercial fertilizer, and covering rather shallow. If, after coming up, there is danger of frost, the plants may be covered with dirt until the danger is past.

For early potatoes we use the Stray Beauty and Maull's Thoroughbred; the former is an early variety but a light yielder. With peas and sweet corn we make two or three plantings, so as to have them ready for the table at different times through the summer. For a trellis for the pea vines, poultry netting twenty inches wide stretched along the row will be found practicable, cheap and durable.

The smaller vegetables are planted in rows the same as the larger ones, first marking out the ground, then with a shovel plow throwing out a furrow just where the row is to be. This furrow is filled with manure nearly to the top of the ground. The dirt is then hoed back into the manure, making a ridge; this ridge is raked down, using first a potato hook with long tines and then a garden rake, so that when the ridge is ready for the seed the top of it is down nearly on a level with the surface and we have a fine, mellow seed bed. The seed is planted by hand, the soil being firmed by tamping with the back of a hoe. I suppose that the superiority of different varieties of vegetables varies much with localities. With us, however,

we use the Iceberg, Big Hanson, or Boston lettuce, the long red radish, the Egyptian blood beet, the silver skin onion, the hollow crown parsnip, the half-long carrot, the Hubbard squash, the winter luxury pumpkin and the Giant Pascal celery.

The squash, cucumber and melons are planted in hills, keeping the hills in rows, however, so as not to interfere with cultivation. In planting these latter we first dig a hole about twenty inches in diameter and 8 to 10 inches deep, filling these holes with manure and covering with about two inches of soil, then place a box around the hill and plant the seed on the inside, putting in a number and thinning to four or five good, strong plants. The boxes protect the young plants and are left until the vines start to run.

The tomato, cabbage and celery plants are started in boxes in the house. The tomatoes being transplanted to the cold frame as soon as the weather will permit. By the use of the cold frame, we get good stocky plants with fruit already set, by the time we can set them out in the garden. In setting these large plants out, we dig a large, deep hole, putting in some manure, then by taking up all the dirt that we can make cling to the roots of the plants and using plenty of water, and taking care to have the surface of the ground around the plants of dry, fine soil, we are able to transplant the plants without having them wilt enough to injure them. By this method we get ripe tomatoes in July, which is several weeks ahead of our neighbors.

The cold frame is made by digging down into the ground about two feet, preferably on the south side of a building or on a south slope, and placing a frame the size of two window sash or a regular cold frame sash in the hole, letting the frame come up six or eight inches above the top of the ground and having the top of this frame slant to the south sufficiently for the rain to run off readily.

About March 1, we put in eight or ten inches of horse manure, tramping it thoroughly, on top of which we spread two or three inches of dirt and cover up with the sash. After the contents of the bed are thoroughly warmed up, we put in the plants. If the small black fleas or swales attack the plants, sprinkle the ground with air-slacked lime. As the plants grow and the weather becomes warmer, they will require an abundant supply of water. The sash should be opened or taken off entirely during the day, so as to harden up the plants. The celery plants are transplanted into large boxes, where, if they are given an abundance of water, they will make good, strong plants by July 1, when they can be put out. While visiting a large market garden this past fall, we noticed that the celery was planted near to the surface of the ground and hilled up, instead of being set in trenches; the gardner claimed that he got better results by so doing.

For cultivation in the garden after everything is planted, we use a Planet Jr., five-tooth cultivator. For working close to the small plants, we put on a set of one and a quarter-inch teeth; these go deep and do not throw dirt onto the plants; after the plants get large, we use a three-inch set. By persistent cultivation and hand hoeing we are able to keep the garden free from weeds and in a fair condition of mellowness throughout the season. By following these methods we are rewarded with an abundant supply of garden truck, which is a source of gratification and causes us to remember that "it is good for man to enjoy the fruits of his own labor." No farm garden is complete, however, unless it contains a strawberry bed, which must be reset every third year, and raspberry and currant bushes sufficient to supply the needs of the family.

FARMING ON A LARGE SCALE.

By HON. S. R. DOWNING, *Goshenville, Pa.*

Has it been shown that, as a rule, farming on a large scale, in the broad way of large capital and labor used, pays better than the narrow and rather up-hill way of farming, the little, old-fashioned manner of agriculture?

There is near our place in Chester county a farm of 600 acres, with two sets of buildings, the latest machinery, a creamery, traction engine and mills for grinding, all under control of an expert manager, with handsome teams in Philadelphia for the delivery of butter, together with a colony of colored men to work on the farm, milk and care for 50 cows, and yet a sale board is set out on the road I travel to West Chester referring to an agency for the sale of this farm. In another part of our county is another farm of much less acreage and fewer cows, where the milk is mainly purchased, made into butter and distributed in Philadelphia by teams owned by the proprietor of the farm and creamery. This owner, it is said, makes money, hiring little, and using much less capital on his farm than that used on the 600 acre farm having a less number of cows.

Again, I have in my mind operations on a large scale, where what is termed sanitary milk is produced and bottled from Guernsey and Jersey stock, where baths are located in barns and milkers pass among the herds in costumes spotlessly white, and yet rumors fly

about their operations that there is not a lavish gain and the lack of promptness in paying feed bills seems to verify the rumor. In these operations, the milk is totally produced by herds and on the farms owned by the operators.

Now, Mr. Charles E. Hires, proprietor of the factory for condensing milk located in Malvern, in our county, has neither farms nor herds, and, singular to say, because of this lack of farm and herds, he may make money. The hardship seems to be in carrying a farm and herd in a large operation including the manufacture of butter and its delivery to customers.

Can you remember, fellow farmers, of having seen in print any statement showing profits from large farm undertakings, where large acreage is involved and large capital employed in the matter of general farming. You may have so read, but I have not. On the other hand, the wail of Henry Ward Beecher and Horace Greeley is remembered by us older farmers to the effect that farms are expensive luxuries.

But we remember, I think, that from far off years up to yesterday, statements have been continually made in public print of profits from small patches of potatoes, the little orchard, the few chickens, the eight or ten cows, the short rows of strawberries, the narrow belt of asparagus—indeed, the little farm well tilled.

Ought we not in this to be pretty well satisfied that a small acreage well tilled, and little money in farming well applied, does, as a rule, reach farther in welfare to us than greater acreage and large expenditure to the more wealthy and the esteemed fortunate.

In this estimate I have often thought that it would be good policy for some farmers who stand upon the brink of loss to sell out and go back to the beginning, and, instead of feeding and manipulating 40 profitless cows, to start again with 15 big, hearty, first class cows that will milk "even up" with the 40 stags formerly owned. So with horses, sheep, swine, or chickens. So with fruits, too, and crops.

Labor and capital are costly. We should, I think, ask: "How can we grow the best with the least labor and capital?" The answer may be, simply by having no more to do than we well can do mainly within ourselves and family. Should we trace the successes in farming cited in the agricultural press, would we not discover that those abundant returns in a money way come of the family itself—father, mother, sons, daughters. These are intelligent, devoted, interested laborers. There is a difference as toilers on the farm between a colony of southern negroes and the family whose home is the farm on which they reside. So that, can we not conclude that a family operating a hundred acres carefully can get as much out of that acreage in the way of profit as the negroes may lose on 600 acres to the proprietor thereof. And this may be a wonderful profit.

Good farm laborers are scarce. The fewer the laborers we depend upon the greater the chances of a paying husbandry. So with the farm; the larger it is, the greater the risk, and vice versa.

In this connection, there must be considered capability. It requires to-day a wonderfully capable man to make even a hundred acres pay, far aside from 600 acres. To compel 600 acres to return three per cent. on its assessed value in our county requires a measure of good management and labor that if it has ever been known among us, is exceptional.

Now, I would like it if we could point to the splendid farms of our wealthy neighbors and say that these farms pay handsomely. This for the reason that we would desire to branch out and paint up and shine personally as money getting business men by taking the broad way of venture and faith and enterprise. We want room in which to spread. So do our boys and girls. But whatever I may or may not like, it seems to me, and perhaps to you, that God has placed us just where we ought to be, and I think we certainly should be thankful that it is rather on the farm, if it is small, than in Wall street or the bucket-shop business. It is a good thing, too, I think, that food is plenty and that none of our dependants the world over are starving because of the extortion of the farmer, however the middle fellow may or may not squeeze the poor. The farmer is certainly more free of judgment to come on this score.

A PLEA FOR BETTER LIVE STOCK IN PENNSYLVANIA.

By PROF. H. HAYWARD, *State College, Pa.*

In the early history of agriculture, the wealth of the husbandman was estimated by the size of his studs, breeds and flocks, while his wealth to-day is nearly always estimated by the amount of land his deeds call for, his live stock being seldom considered. However, according to the last census report, it is safe to say that the value of the live stock in Pennsylvania is a little over 85 million dollars, and I believe it is possible to so improve our stock that the same number of head would be worth 150 million dollars. If there is one thing that the farmers of Pennsylvania need at the present time, it is a higher appreciation of the value of and a more active interest in a better class of live stock than they now own.

I once heard a prominent man, who is a close observer, say: "If you will tell me what a people eat, I will tell you how that people stands among civilized nations." I feel with equal certainty that if I can see or know what kind of live stock a farmer has, I can tell not only how he stands as a farmer, but also how he stands as a citizen among his fellow men. It is impossible to breed a dairy cow that will produce 700 pounds of butter in a year, a steer that will dress 70 per cent. of meat to the cwt. live weight, a sheep that will shear 40 pounds of wool, or a hog that will win at our large live stock exhibitions, without close study of the many questions which arise in developing such animals. One must not only study the laws of breeding and of nutrition necessary to produce and perfect, but he must also study the various crops he raises to feed, as well as the methods employed by those breeding animals similar to his own. In addition to this, he must meet his fellow breeders, which Proverbs tells us "sharpens men as iron sharpeneth iron." Furthermore, the man who breeds a high class of stock and succeeds in it will get much more out of life as a farmer than he who takes no interest in the quality of his horses or cattle.

The writer is well acquainted with a breeder, the fame of whose Holstein cattle has spread over all this country as well as Canada, who began life with no capital, but with an appreciation of the value of good cattle. With a determination to succeed as a breeder and with a perseverance that overcame the many obstacles that beset him, he has made himself very well-to-do and his herd has a reputation exceeded by none. He is far happier in his achievement and has reared a far more enduring monument to himself than some fellow farmer who has frittered away a lifetime for the uncertain fame of a small politician. This breeder is but one of the young men who have risen from obscurity to prominence in the breeding of fine cattle. Do you not suppose such a man has enjoyed life, with all his hard work, much more than the farmers of this State who have nothing in particular to interest them? Some of you may say this is all sentiment and we cannot invest our money in improved or blooded stock for mere sentiment.

In order to meet this fairly, let us define the term "improved stock." "Improved stock" is that class of animals that will give the greatest net return for food consumed. In the care of beef cattle, for example, the steers having a large percentage of blood of any of the beef breeds, will, perhaps, not gain more pounds per day than the scrub steer nor make his gain on less food, but he will put more meat on those parts of his body that furnish the high priced cuts than will the scrub steer. What is true of the steer in this connection is also true of the other meat producers—the sheep and

the pig. Twenty-eight per cent. of a good carcass of beef sells for nearly 64 per cent. of the total value of the carcass. The high priced cuts are the ribs and the loins, and in growing beef, or any meat producing animal, it should be the aim to feed or raise only those individuals that will put the maximum amount of flesh on these valuable parts. In case of dairy cows, "improved animals" are those that will produce a maximum amount of milk and butter for a given amount of food. Or, in case of the general purpose cows, those that will produce a large quantity of milk and beef. This ability to do well is termed quality in live stock. It is possessed in great measure only by high grade or pure bred stock and is the most important factor to be considered in all farm animals.

This plea for better stock is made, please remember, for your sake, brother stock owner, and I wish to call your attention to a few points, feeling sure that you, as well as your stock, will be materially helped if they are observed. Three essentials to success in stock raising may be briefly touched upon: These are breeding, feeding, and care or management. If these are once mastered, a breeders' success is almost assured.

In regard to breeding, this much may be said here. Choose those breeds for which you have a natural fondness and which are adapted to your conditions. Do not choose the Hereford or Angus cattle if your farm is rough and hilly, or the Ayrshires if your pastures are low and grow an abundance of grasses. Start right by investing in a few superior animals, rather than in a larger number of inferior individuality. Do not cross breeds, but stick to the breed of your choice through thick and thin. Select your sires with greatest care. A hundred dollars extra invested in the right kind of a sire may return you a thousand extra in his superior offspring. Select individuals, rather than pedigrees, but study to become familiar with a large number of the most prominent individuals of the breed in which you are interested, that you may be able to estimate a pedigree at its correct value. Do not invest too heavily in single families or strains in the height of their popularity; rather try to make a family of your own herding popular and reap the benefits yourself. Do not yield to the temptation of breeding for some fancy point at the expense of general utility. If you succeed in raising a cow that will produce 700 pounds of butter in a year, no one will ask if her tongue is black or whether she has a Flandrine or a Selvedge escutcheon.

In regard to feeding, it may be said, without much fear of contradiction, that a poor feeder never made a successful breeder, and that a successful breeder is always a good feeder. He may not understand the chemistry of foods nor know how to compute a balanced ration, but he does know how to give a calf, a lamb, or a pig,

such food and at such times as to have each gain steadily every day of its life up to maturity; but if one does know the relative value of the several foods at his disposal, he can nearly always save money in compounding needed rations. It is an art to feed live stock of any kind in such a way as to secure the best possible results. We feed enough, in most cases, but we do not pay enough attention to what we feed and how we feed. It does not pay and is not necessary, as a rule, either to grind or to cook food for most kinds of stock. But it does unquestionably pay to supply the lambs, the calves, and the colts with the choicest of early cut hay, with a little oats, bran and oil meal, rather than to feed them straw, corn fodder, or corn. When animals are young they will make their gains the cheapest. We want them to make all possible gain not only because they make it cheaply at this period of their lives, but because, if they are colts, we want them able to begin work. If they are dairy calves, we want them to grow as much as possible without becoming coarse, so that they will start with 300 pounds of butter production in a year, when two years old. If they are steers that are to be fed for beef, they should be finished when thirty months old. To accomplish results of this kind, it is necessary not to allow them to lose their "milk flesh" nor to stand idle a single day, since a stagnation in growth at any period means loss to the owners.

Feeding does not consist merely in putting a certain amount of food before an animal once or twice a day, but, after studying the peculiarities of each individual, in satisfying, so far as possible, his every want. There is a German adage, "The eye of the master fattens his cattle." Too much emphasis can not be put upon studying to know the wants and needs of the animal you are caring for. It is the keystone in the breeder's arch of success. The principles which every successful breeder must bear in mind are few; the details involved in working them out are many and cannot be definitely stated. The most important of these principles, as summed up briefly by Prof. Shaw, may be stated as follows:

1st. Animals must possess quality before they can be fed with marked success—quality usually involves the consideration of breeding, form, and handling when making selections for feeding.

2d. More food is required to make a given gain as the birth period is receded from, in consequence of the decreasing activity of the assimilative functions and the increasing requirement of food for maintenance with advancement of age; hence early maturity is an important essential in all animals.

3d. When periods of stagnation occur before maturity, the food of maintenance during such periods brings little or no return. Usually the loss is proportionate to the continuance and completeness

of the period of arrested development. When development is completely arrested, the only return for the food and labor of feeding is the manure.

4th. When development is seriously arrested at any period before its completion, the feeding quality of the animal is affected adversely. This arises, in part at least, from the disarrangement in the equilibrium of the system which permanently impairs the vigorous action of the digestive powers.

5th. When development is unduly forced by stimulating foods while the animal is still young, its feeding quality is injured for all time.

6th. In fattening animals, when they are so ripened that they cease to make good gains, further feeding can only be done at a loss. Experience and close observation are necessary to determine when this stage is reached. The aim, therefore, should be to so gauge the period of ripening that the animals will be ready for disposal at that season when markets are usually good.

7th. In selecting a ration for feeding, due regard must be given to the chemical constituents of the food or foods which compose it. These will vary with the class and age of the animal and the purpose for which it is being fed. The aim should be to form a ration suited to the wants of the animal at that time.

8th. In nearly all cases a mixed diet is superior to one composed of any one food, since a single food seldom contains all the elements of a perfect food; the exceptions are grasses for maturer animals, and new milk for the young.

9th. The value of foods cannot always be estimated by their chemical constituents, as foods of nearly the same composition have opposite effects upon the system.

10th. Discomfort from any source, as for example, cold, heat, insects, or excitement, arrests development and therefore produce loss in proportion to continuance and intensity.

These are the principal laws governing the feeder. In themselves they appear and are simple, yet it requires a master hand to work them out; but the reward attending the effort to observe them is ample. What gives more satisfaction to the farmer than to see a bunch of calves or lambs doing well in rapid growth and development? It not only gives satisfaction to the eye; it also lines the pocket and builds up the farm.

The other essential to successful stock-keeping, is care or management. As I go up and down this great Keystone State and see cattle humped up in the cold wind, and as I look into the dark, cold barns and stables, I am convinced that if we could only realize that it actually pays in dollars and cents to make our stock comfortable, we should set about doing so. Warm, dry, and well ventilated sta-

bles are necessary to the well doing of stock. Of course, not all our old barns can be made into models at once, but a few dollars spent in battens will do a great deal toward saving the feed bill and a little white wash, containing some chloride of lime, spread over the stables some rainy day, will do much to make the stable light, and to destroy any lice that may be in the cracks waiting to make some calf or colt uncomfortable all winter. In short, anything we can do to make our stock comfortable, healthy, and thrifty, makes for success.

We will consider one other inducement which the Pennsylvania farmer has to raise pure bred stock. It costs no more to raise a registered animal than it does to raise a scrub or a grade. Other things being equal, a pure bred animal is just as good as, and in most cases better, as a wool, meat, or milk producer, than a grade or a native. A pure bred is much more reliable as a breeder, and, in many cases, a young pure bred will bring twice as much money as a native or a grade for a breeder. Whatever it brings above the price of a grade is, of course, clear gain to the producer. Not very long ago, I saw a breeder sell his herd of cattle, which, with a few exceptions, he had bred himself, for \$22,000; an average of \$216 per head for old and young. Last spring a breeder in the west sold his herd of cattle for \$47,000; and there are scores of breeders who regularly sell thousands of dollars worth of pure bred stock of their own raising each year. Some whom I know personally are gathering a moderate fortune in this way. Furthermore, by breeding fine pure bred stock, one can, by exhibiting at the large fairs, not only advertise his stock, but can also win considerably more than enough to pay his expenses. I am acquainted with some breeders in this State who annually win from \$500 to \$750 more than expenses in this way. I believe there is no surer way for a young man, with reasonable business ability and a fair education, to succeed, from a financial point of view, than by building up a herd of pure blooded cattle.

In view of the facts which have been presented, it seems to me that all the farmers of Pennsylvania ought to rise up and push the "scrub" off their farms and in his place, substitute the animal that will pay for his keep and yield a good rate of interest besides. A little care and forethought will enable anyone to do this, and when it is done, Pennsylvania farmers will enter an era of unprecedented prosperity.

GEOLOGICAL RELATION OF SOILS.

By PROF. M. C. IHLENG, *State College, Pa.*

No State in the Union is so well favored of nature as is the Commonwealth of Pennsylvania, which well may expect soon to be again called "Penn's Woods." Her vast mineral resources in iron ore, coal and oil have been demonstrated; her manufacturing industries are recognized as placing her in the first rank of the sisterhood of States; her ability to supply the world's demand for building materials must soon be admitted, and the systematic procedure of her agriculturists are rapidly developing her untold agricultural possibilities. To this same end, too, the natural agencies are contributing their potency. But whether or not the efforts of both are in harmony, or the harvests as generous as they should be, have not yet been ascertained. Doubtless every farmer is tilling the soil which he finds on his lands with the best means and under the best guidance at his command. But does every farmer protect that soil from the ravishments of the natural forces? Does he join hands with them to ensure the existence of an arable soil on his farm when spring comes? Does he appreciate what his forest land is doing for him to protect the farm? Every soil represents the results of a certain amount of energy. It is not a final product of nature, but is merely one intermediate stage of the existence of all mineral matter in its process of decomposition from rock to liquid, and from mountain to sea. If this superficial deposit is not arrested in its descent to the ocean, the question for next spring is, whether or not nature will create a new soil of equal fertility. My purpose, therefore, is to consider the forces operating to produce such deposits and the origin and distribution of soils within this State.

Over the State of Pennsylvania there falls upon every acre of ground during each year more than 20,000 barrels of water. Some States are more copiously supplied, and many are producing higher agricultural values than Pennsylvania on an aggregate rain and snow fall of but 15 inches, or 8,000 barrels. Most of the water flows off from the surface to some creek and thence to the ocean, the smaller portion penetrates the earth and disappears below or rises into the upper air to be again condensed and precipitated as rain. All of it either dissolves or washes away material from the surface,

every cranny, crevice or pore of the earth or rocks is entered, channels are eaten away, fragments are loosened, rocks broken up and disintegrated, and mountains are destroyed. No rock is free from its corroding influence; no mineral can resist its attack; everything succumbs to the universal force; everything yields before this ceaseless agent. Mountains are sculptured and surfaces denuded, their debris transported into the valley, over the valley, down the valley and thence to its home, the ocean depths.

Here, throughout the ages, is accumulating the wash from continents more or less remote. Along the coast, the waves break down the cliffs and deposit clean, pure sand. Far out in the deep, come washings from the Rockies, slimes from the richer valleys, decayed vegetation and myriads of animal organisms collected by covetous inland waters in their steady journey to the sea and buried under its dark mass to form a soft, black, rusty ooze. Soon it hardens and becomes a layer of rock.

As the ocean floor is now, so it has remained for ages past; so must it remain for time to come. Though its floor may rise or fall and the level change, the sea is the same yesterday, to-day and forever.

At some future time the hardened sands at the shore and the limestones now in the deep sea will be elevated, just as has happened to the sandstones and the limestones which now form the land on which we tread. West from the South Mountain range, Pennsylvania has been under water, its 38,000 feet of rock crust of the earth having once lain cold and dormant at the bottom of the sea. Prepared throughout, who can say, what unrealizable periods of time, for the use and enjoyment of man with organic and mineral elements for supporting vegetation, these several limestones and sandstones once rose dripping from the sea and were folded into the rolling topography of the earth's surface. Grand as were these forces involved in uplifting the ocean bottom, no less so is the corroding power of the gently falling rains and snows to which all land everywhere yields. Proud mountain domes and ranges acknowledge its supremacy. Valleys fill and the ocean accumulates a fresh sediment. The whole history of the visible land consists of upbuilding and destruction, rebuilding and disintegration by the action of forces which have left gigantic monuments of their mighty power. Of this everlasting contest between the destroying and upbuilding forces of nature, the broken rock and pulverized earth are an ever present witness.

Such has been the geological history of this State with its varied rock formations and horizontal, and in the eastern half of the State tilted and eroded. Such has been the history of that superficial covering with which we are now most concerned, and throughout

the ages have been prepared for the habitation of land animals, not only the rock foothold which has been constantly increasing in area, but also an earth covering out of which spring all life. Throughout the ages the ocean has locked within the soil that covers her floor, mineral and organic elements; and these were not lost by the rock when it rose from the sea.

The rock waste contains all the elements that existed in the original rock, and our soil is but a counterpart of that deposit on the oceans' floor. The contribution of continents have successively produced lime, clay or sand muds that contain all the mineral ingredients favorable for the growth of vegetation, and for ages all the forces and powers of the mighty ocean have been engaged in rendering them fit for such uses as man has put the soil to. As the unhardened floor of the sea is an exceedingly rich soil, the consolidated masses of limestone, sandstone and shale, though mountains of which we passed on our way to the meeting, are but condensed plant food, requiring only the completion of the processes by the agency of rain to create a medium into which the vegetation may insert its roots and from which may be extracted all the nutrition requisite for its growth.

I have no hesitation in affirming that this product of the waters possesses every essential for cultivation. The poorest and most stubborn clays have untold possibilities for the service of man. Often these treasures are securely locked and require a system wiser than our own to find the key. But no soil is so lacking in fertility that it would not grow a generous crop if it be kindly and wisely nurtured.

The bulletins from the Cornell University, confirmed by others from elsewhere, state that almost any soil in their State should produce three times the potato crop it does, and would produce it with proper cultivation. Why, then, is the crop not larger? Why is an incipient exhaustion so marked in many of the counties of this State? Is it deficiency in the soil? Is it the neglect of tillage? Is it the failure to manure? Answer these questions as you may, I declare that the husbandman may rotate his crop, may fallow his land, may turn under his crimson clover and will have thereby a richly producing tract; yet, if he fails to gain mastery over the torrents that fall on his land, that remove its soluble elements, that wash its fine soil mulch, the exhaustion which will follow the depletion is more certain and more rapid than that which ensues from the harvesting of such crops as tobacco. He cannot expect to reap, as some have, the forty-sixth consecutive planting of wheat, twelve bushels to the acre, almost the average of the United States, without the use of any fertilizer. This seems a bold proposition, but a

determination of the amounts of nutritive elements extracted by the two media will modify this.

Before this assemblage it would be presumption on my part to attempt to discuss the elements that make for continued fertility. I am sure, however, that we stand on common ground when I assert that rock dirt is not soil, any more than peat, and to be arable, a soil must in addition to from five to ten per cent. of organic matter, possess such a porosity and texture as will allow of the circulation and retention of at least the same volume of water.

The plant food, which is necessary for a generous growth of vegetation throughout periods of excessive rain and of protracted drought, is made soluble and available by the action of the atmosphere on the soil and by humus collected from decaying vegetable matter. It consists of the alkalies and phosphoric acid which are found in limestone, sandstone and shales from which the soils are derived. The richest supply is in the limestone, whose origin is in the deep sea, which contains the decomposed organic matter and the original calcareous material secreted by shell and coral remains built beneath the sea. Wherever its decomposition furnishes a soil in place, there the fertility reaches a high limit. All over the world—the Great Valley, the Little Valley, Morrison's Cove, Genesee Valley—limestone soils are of the highest degree of productiveness, not only when cultivated, but even when undisturbed by artificial agents, as is witnessed by the "Oak Openings" and other luxuriant native forest growth subsisting thereon. Limestone is easily acted on by the atmospherical agents and by the solvent power of the waters, which readily dissolves material and renders it capable of assimilation by the myriads of rootlets which easily penetrate its soil; but in that process nine-tenths of the rock is dissolved and carried away to the sea. The residual soil of a limestone is composed of clay and sand, only one-tenth the volume of the original rock.

Sandstones are more porous than limestone and are less soluble; they lose, therefore, less of their constituent grains and are more readily attacked by the mechanical agencies we have mentioned, than are limestones. Their soils are loose, very porous, and unless replenished by natural drift from the limestones or the shales, would be unprofitable to agriculture, because the soluble ingredients, the nutritive elements, are lost by the descent of the ground waters. Sandstone soils, too, are more likely to be deficient in the alkalies than are the limestones and we therefore find native, only a forest growth of stunted timber of inferior kinds.

Shales furnish a heavy clayey waste, because they are made of comparatively insoluble clay with a cement of lime or sand, and, though rich in the alkalies, are poor in phosphoric acid. They yield readily to the attack of the atmosphere, furnishing a residual clay

which is close, compact, little soluble and easily washed away. The native shale soils are usually stubborn. Their compactness prevents percolation of ground waters, retards the process of soil making, and therefore requires more careful treatment than is desirable. Without rational treatment, they are totally incapable of supporting ordinary field crops, though fruit trees and forest thrive well upon them.

As these three are the only varieties of rock, furnishing several grades of soil, analysis may be adduced to show that the plant foods which they contain are ample in amount; but they require the action of other agencies to render them arable and capable of bearing ripened vegetation to the highest degree. Of the 4,500 tons of water falling upon every acre of the surface of the earth, a large proportion enters the soil as an effective element of food as a medium for transporting the nutrition and as an important and physical agent in cultivating the soil, while the larger amount is lost by immediately passing from its surface, carrying with it such fine material as is capable of transportation.

We shall see presently the necessity for restricting the amount of this surface wash; meanwhile, let us consider what is transpiring below the surface. The rain in its descent through the atmosphere dissolves from the atmosphere the all-powerful carbonic acid, which decomposes the organic matter in the earth and produces what we choose to call humus. This has the property of absorbing moisture and soluble substances, and also, with the oxygen of the air, of acting as a reducing agent to fix many of the necessary compounds of plant food. When these waters enter the soil they are capable of circulating through it according to its capillarity, and the degree of capillarity is determined by the fineness of the earth. A coarse sand has little capillarity and will not restrict the free descent of waters. It is therefore incapable of retaining much of the moisture that enters during the rains and long before the drought ends will have disappeared. Little benefit accrues to shallow rooted crops and the soil becomes irreparably exhausted. Limy soils are quite dense, have a medium degree of fineness and of absorption. A finely decomposed clay has a high capillarity and a power of imbibing fifty per cent. of its volume of water. A soil which is exceedingly close, like a native shale soil, does not permit much circulation of the rains and their soluble contents, but it sheds the waters which are soon lost in the sea. Only a medium soil containing a proper mixture of clay and sand is capable of circulating the solvent waters without allowing too much to descend. This happy medium may be procured by natural processes of mixture or by our artificial process of cultivation. Those waters which have entered the crust of the earth have disappeared beyond reclaim. They are not within

our control, and it is only by the admixture of an amount of clay to the porous material, or by the formation of a dense subsoil that we can prevent their escape with all the soluble contents which they have extracted from the rock. It is, therefore, with the waters which are to be retained in the soil, and those which should be arrested on the surface, that we have any concern.

Every ton of dry organic matter produced upon the farm requires from 250 to 500 times its weight of moisture in the soil. An acre of potatoes requires 1,300 tons of water to circulate during the growing season; an acre of oats requires 1,000 tons to supply the evaporation from its foliage and to carry the nutriment from the soil to the plant. To retain such an amount out of the 4,500 tons which fall, requires skilful husbandry and the most careful preparation of the soil. This calls for such a state of fineness that the texture of the soil will hold and circulate the amount required. Cultivation accomplishes this to a great degree, and yet not as vigorously as the natural agencies which are engaged in aiding the farmer. The mechanical movement of the solutions, their freezing and their expansion, opens the pores to the water in the rainy season and to air in the dry season. The air with its oxygen furnishes the final element of the decay and sets free the plant foods, mineral and organic. That process of cultivation, which will retain this nutritive element and prevents its extraction and removal by the surface waters, will prove the best means of prolonging the fertility of the soil and of ensuring frequent harvest. If, in addition, the land be enriched by returning to it all organic wastes, the process of restoration is more rapid than the process of exhaustion, and our system of farming ceases to one of spoliation. A generous soil properly cared for will continue to furnish all mineral nutritive elements; and, with the organic elements provided for, the conservation of the moisture within the soil and the torrents upon its surface becomes our sole aim. A soil which has the highest degree of capillarity will not only circulate through its mass the ground waters, but will also carry them to the surface, where, during periods of drought, they will accumulate to be evaporated and lost. If the surface is not cultivated so that its clods are broken the evaporation from the soil is more rapid than the exhalation from the foliage on the plants, and if the drought is protracted the crops are burned. The object, then, of tillage is to retain the moisture by preventing loss at the surface, and this loss alone is not insignificant, for untilled soil evaporates at least 100 barrels more per acre in a given season than does a properly cultivated soil. This evaporation is also at the expense of heat and becomes cold. A light colored clay is excessively so. Its wheat is winter killed. But this evaporation of the water from the surface has still another effect. It deposits in the

top soil all the soluble elements which it contained; not only are they inaccessible to the myriads of rootlets which are many inches below seeking this available food, but they are exposed to the torrents and floods of the first rain which carry them off to some lower level. This soil ought to be caught in its descent to the sea. This product is nature's richest gift to her sons of the soil. Ignored or neglected, she returns it again to her vast treasury, the sea, there to remain until she bestows it again upon a more provident race. This rich soil covering has been mellowed by all the agencies that contribute to a proper mechanical condition, and is saturated with the soluble elements leached out of the soil below and can be observed on the side of any slope nearby the farm. This is a rich and cheap fertilizer, than which nothing is better, and it is the material to which the late Col. James Young referred at one of your meetings, when he declared that this was the fertilizer from which he had the best returns. He recovered in the winter time what the previous year's rains had removed from his land.

Of this slow, unnoticed removal of our soil covering all are victims. From all lands, from every tract, washes away immense possibilities which must be arrested if we would prevent the ultimate exhaustion of our soil. For just as long as the natural processes continue, so long will this covering form and as promptly will it be removed. If all our agriculturists would adopt Col. Young's method they would retain the productiveness of their fields and prevent a diminution in the agricultural value of the farms. The process of cultivation, which we have already seen decreases evaporation of the surface waters, contributes to prevent surface wash, for it renders a surface, which would otherwise be smooth, so rough that the rains will penetrate the top mulch and enter into the interior.

I believe that the present German system of assessment of agricultural lands is based upon this principle, that certain rock formations produce soils of known fertility and porosity. A reasonable amount of cultivation, but without the use of artificial fertilizers, produces a given value of crop, and this represents the interest of the capital which nature has supplied the farmer. The capital is assessed. If the harvest does not reach the expected returns the fault is with the farmer, not with nature.

The amount of this wash is greater from an uncultivated soil than from a thoroughly porous soil. It is greater from the rich limy soils than from the porous, open, sandy soil. It is greater from plowed than from spaded lands. (A mechanical subsoil spade, by the way, would be a desirable farm implement). It is greater on a hillside than in the bottoms. Hence, in the west and northwest portions of our State, where the lands are generally high, with the rocks horizontal, the soil is subjected to but little wash, particularly

as it is covered by sod and forest. And this protection of the soil surface by the sturdy growing tree is of immense value to agriculture. The southern and eastern counties, however, have a complex topography and their rocks are highly inclined and they suffer very much from the scour and the transportation of the soluble elements of their rocks from hill and dale. Impoverishment threatens their lands. Those which exceed an inclination of 15 feet in 100 should be devoted to forests only, because the depletion of their surface is more rapid than the possible replenishment from natural sources. Timber is the only crop that can be harvested there without immediate loss of fertility. Fields having a slope nearly as great, should not be plowed any more than is necessary to bring them to the state of good grass lands. Late fall plowing would be better than early spring plowing. The encouragement of rye or other green crop during the winter months should be regarded. To one cognizant of the vast storehouses of riches in and under the soils, the main causes for the depletion of our lands appears to lie in the reckless effort to win for the plow, lands totally unfit for the unnatural form of cultivation (since it must be conceded that the processes employed in obtaining the crops are essentially unnatural), and in the extravagant waste of the riches of the soil in the absence of adequate provision against the ravishments of surface waters. Several methods have been suggested here, and elsewhere, and it is skilful husbandry and our imperative duty to generations to come to preserve these natural soil fertilizers.

The subject lies at the very foundation of public prosperity, and, except through intelligent comprehension of this question, no hope of amendment is possible. I do not pretend to have discussed this subject from an agricultural point of view, but wish to show the results of certain phases of geological inquiry which have as vital and as definite a concern for the agricultural and forestry interests as the other lines of geological investigation have for the economies of the mineral industries. Geological agencies furnish the basis for the soils, geological forces contribute to their replenishment, and when man's efforts are in harmony with geological processes, abundant harvests will be the reward for untold generations.

The following analyses of limestone and sandstone will illustrate the point raised. It will be noted that the only change in the character of the sandstone soil as compared with its primary rock source is in a slight reduction of the silica, sand, and a corresponding increase of the other constituents. The sample taken is from a location where there was little accretion from any source than the underlying rock.

Sandstone.	Rock.	Sub-soll.	Soll.	Arable.
Water and organic matter,	0.6	2.6	4.7	10.9
Silica, sand,	91.7	81.8	78.8	73.0
Alumina, clay,	3.7	7.6	9.7	9.1
Alkalies, potash,	1.8	2.8	2.6	2.7

Sedentary limestone soils, on the other hand, manifest a great change by the solution and disappearance of their soluble lime-carbonate which is reduced from 78 per cent. nearly 2 per cent., while the insoluble silica accumulates until the original 5.1 becomes 65 per cent., and the soluble silica increases from 1 per cent. to nearly 12 per cent.

Limestone.	Rock.	Sub-soll.	Soll.	Arable.
Water and organic matter,	1.2	3.6	7.7	8.9
Insoluble silica, sand,	5.1	40.0	64.5	65.5
Soluble silica,	1.0	1.7	11.2	11.7
Insoluble alumina,	2.3	2.0	1.6	1.3
Soluble alumina,	0.6	1.1	7.2	7.9
Calcium, carbonate, lime,	78.1	43.1	6.2	2.7
Potash, alkalies,	0.1	0.1	1.2	1.5

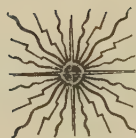
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THE HOLSTEIN-FRIESIAN BREED.

By S. HOXIE. *Superintendent of Advanced Registry of Holstein-Friesian Cattle Club.*

Public interest in this breed is rapidly increasing in the richer and more important dairy sections of this country. At the last annual meeting of the Holstein-Friesian Association of America, 65 new members were received. Its total membership was 748, which had nearly doubled in five years.

This breed is imported from North Holland and Friesland, two provinces of the Netherlands devoted to dairying in the almost exclusive use of this breed. Here the breed originated. The farmers of these provinces are descendants of the ancient Friesians and their cattle are lineal descendants of the cattle bred by them two thousand years ago. From the earliest account of dairy husbandry these cattle have been used and developed for dairy purposes. North Holland has been mainly devoted to cheese production, and Friesland to butter production. As an illustration of the extent of the latter production, the following statistics are quoted from Chamber's Encyclopedia. The area of Friesland is 1,253 square miles (53 less than the State of Rhode Island). In 1874, England imported from Friesland 40,763 cwt. of cheese and 266,041 cwt. of butter. Reduced to pounds, these importations were 4,565,456 pounds of cheese, and 29,796,592 pounds of butter. In 1879 the number of cows in Friesland was 144,802. Assuming an equal number in 1874, this importation of butter from Friesland was an average of 205 $\frac{3}{4}$ pounds for all the cows, old and young, owned in that province. Even if there was no home consumption and no sales to other countries, these exports alone sufficiently demonstrate the great capacity of this breed. To destroy the force of these statistics, its enemies have sometimes assumed that a part of this exportation was oleomargarine, but this is easily met by the fact that oleomargarine was not known in Friesland at that date.

THESE CATTLE IN OTHER PARTS OF EUROPE.

If allowed to spread without artificial restrictions, the value of a breed may be judged by its aggressiveness; in other words, by the territory over which it spreads in competition with other breeds. Especially is this true of dairy breeds found as such breeds are, only in civilized countries and on valuable lands. This breed is found in more countries, occupying more territory, and probably producing more milk, cheese and butter than all other dairy breeds combined. These facts are brought forcibly to our attention by the reports of American consuls in the commercial centres of Europe in answer to inquiries made by our Department of State in 1883. Going south from the two Netherland provinces, North Holland and Friesland, where this breed originated, and from whence it is mainly sought, it has spread over the provinces of Utrecht and South Holland, almost exclusively occupying them. Farther south is the Kingdom of Belgium, the most densely populated state in Europe. Three of its provinces are largely devoted to dairying, Antwerp and East and West Flanders. The peculiar location of Belgium makes it equally easy for the dairymen to import from England, North Holland and the Islands of Jersey and Guernsey. The government has granted subsidies for the importation of foreign breeds to improve the stock of the country. No country is so well situated to pass judgment of the various breeds. The dairymen of this country have been acting the part of a great jury. Their suffrages are shown in the reports of the consuls accredited to its provinces.

Says Consul Stewart of Antwerp: "Antwerp prefers to improve her stock by the introduction of the Dutch race, because the dairy is the result aimed at and but little attention is paid to other products. The cow is valued only by her milk-giving qualities, and for this purpose the Dutch are much the best."

Says Consul Wilson of Brussels: "In the province of Antwerp the production of milk and butter and the raising of vegetables for London and Antwerp markets are found so much more profitable than the growing of beef cattle that the farmers of that district will have nothing to do with but such cattle as produce the largest amount of milk upon the smallest amount of food, and for this they prefer the pure Dutch cow or her crosses with the Flemish animal."

Says Consul Tanner of Liege: "So far as the different breeds of cattle in Belgium are concerned, they are as numerous as there are localities of different names, and there has not been that general and universal effort to retain purity of breed in Belgium such as has been the case in England. There has been an effort, however, to this end in a few cases of families of rank, who have been very par-

ticular about the pedigrees of their cattle, and therefore in this way there are several breeds that have retained untarnished pedigrees most faithfully. The breeds to which I allude present now in outward appearance and in results, for both the dairy and for beef cattle, that cannot be surpassed in the world. This is more particularly true of the breeds known here as the Hollendais or Dutch cow, and the Flamande or Belgium cow. There is a strong likeness between these two breeds that suggests unmistakably, to a judge of cattle, a common origin. * * * The Hollendais or Dutch cattle on the whole, I think, are generally more esteemed than any other."

Eastward from its place of origin this race has spread even more extensively than southward. It has extended even to Russia, where, at the mouth of the river Dwina, nearly under the Arctic Circle, it has produced the Kolmogorian breed, the most highly valued cattle of that country. Whether it might not have spread westward into England and the Channel Islands, but for laws restricting importations from the continent, cannot be said. It is however asserted by Professor Low, an eminent English author on breeds of cattle, writing in 1840, that early importations of Dutch cattle exercised great influence on the formation of the Teeswater, afterwards known as the Shorthorn breed.

THE TYPE OF THE BREED.

This is technically called the milk and beef form. It is especially strong in all vital particulars. It embraces strength and capacity for milk production. The bones are fine, compared with size, and the chine broad and strong, compared with the high and sharp chine of the extreme milk form. The loin and hips are broad and smooth, and the rump high and level, compared with the angularity usually shown in the milk form. The twist is roomy and the thighs and hocks well apart. Passing forward, the shoulders are smoother and more compact than in the milk form, but of lighter weight than in the beef form. The brisket is not so wide and low as in the beef form and the chest is not so deep, but the width of the beef form through at the heart is closely retained. In the milk form the abdomen is usually swung low, and the ribs are steep and flat, but in the milk and beef form the ribs are wider sprung and the abdomen more trimly held up, though no less capacious. The general appearance of the bull is strongly masculine, but that of the cow is no less feminine than in the milk form.

The average measurements of full-age cows (cows five years old and upwards), received to the fourth volume of the Holstein-Friesian Advanced Register were as follows: Height at shoulders, 51.8 inches, at hips, 53; length of body, 64.9, of rump, 21.4; width of hips,

21.9; girth at smallest circumference of chest, 75.6. The average weight in good milking condition was 1,262 pounds. The scale of points of the Holstein-Friesian Association of America is intended to be descriptive of this type.

IS THIS BREED A GENERAL-PURPOSE BREED?

If a general-purpose breed is one that is equally valuable for each and every leading purpose for which cattle are used, it is not such a breed. This breed excels in milk production, it is superior for veal production, and valuable for beef production. If this combination of qualities defines a general-purpose breed, it is such a breed. For generations the natural conditions under which these cattle have been developed have been most favorable for this combination of qualities. Looking upon one of its model cows, the broad loin and rump seems just the place for the growth of the finest quality of beef and the fit support of the capacious udder. The straight quarters and well rounded body cannot detract from milk production. We know that her calves are large at birth and that they grow and fatten with great rapidity. In Holland and Belgium this combination of qualities and uses is universal. We quote from an address of Professor Roberts, Dean of Cornell Agricultural College, made in 1878, before New York Dairyman's Association. He said: "I had the good fortune during the past summer to spend some time in North Holland and Friesland. * * * If anywhere on the face of the globe there exists a race of uniformly good milkers, the Dutch have them. * * * The cows, no matter how good, are seldom kept till they become wornout shells; valueless for beef and not fit to propagate their kind, but are sold for beef while they are vigorous enough to put on flesh profitable alike to producer and consumer, and of no mean quality. I ate of it for three weeks and the English beef for two, and while not so fat as the Shorthorn, it was to my taste superior." Bulls of this breed are not castrated in Europe with a view of finally feeding them for beef. The surplus bull calves are invariably vealed. That European methods of handling cattle will eventually be adopted in our richer dairy sections, as the population increases, can scarcely be doubted.

CONSTITUTIONAL VIGOR OR VITAL FORCE.

This is the element that produces endurance under great strain of any sort—in the race horse under the strain of terrific speed, in the milch cow under the strain of enormous production. Under the strain of a severe climate is called hardihood. Take the calves of two breeds of cattle; of the one it is difficult to keep them alive or to make them grow; of the other there is no difficulty of this kind. The difference lies in the difference of constitutional vigor. What

is its invisible cause or source? Is it in a particular temperament—the nervous temperament? There is no proof of this. Indeed, animals of the nervous temperament not unfrequently lack this vital force. Of one thing there seems to be an assurance. Incestious breeding tends to a reduction of its strength. The Holland breeders have never practiced such breeding. It may be weakened by breeding from immature bulls or from cows worn out by age or disease. The Hollanders never breed from such cows and rarely from such bulls. In proof that this breed has maintained a high standard of vital force, we point to its use in almost every climate, including that of Northern Russia, nearly up to the Arctic Circle. Here in America it is as hardy as our native cattle. Its calves are raised without difficulty. Taken from their dams at three days old and reasonably fed on skim milk and a little oil meal, they grow like weeds. Given plenty of food, no matter if much of it is roughage, they will drop their calves at two years old and henceforward are profitable to their owners. Allow me to quote from an address of Professor Carlyle, of Wisconsin Agricultural College.

“A farmer in Illinois, operating an extensive dairy of over 200 cows, is delivering milk in Chicago on the recommendations of the physicians and surgeons there. He receives twelve cents a quart for his milk wholesale. * * * On visiting his farm he gave me an idea which I have never heard presented before and which I am confident is going to be elaborated, especially for the milk supply of cities. * * * The Physicians’ and Surgeons’ Association of Chicago frequently visit him on his farm, and they have asked him if he can give any reason why his milk has more vitalizing power than any other milk they can get. The gentleman remarked that he had never thought of such a thing, that he had always considered one milk as good as another, provided it had the same percentage of butterfat and milk solids. They remarked that if they had a patient that was very much run down and weak, and they gave him of the milk from his herd, they found it had more life-giving, vitalizing power than any other milk they could get, even though it was no richer in its chemical properties. The point I wish to make here is that there is such a thing as vitality in milk, and that it is of equal, if not greater importance than its chemical composition, especially for the milk supply of cities. And there can be no question but that the vitality of milk is closely associated with the vitality of the animal producing it. Strong, vigorous cows, such as the Holsteins and milking Shorthorns, and some few families of the Jersey and Guernsey breeds, are animals that are bound to be required for this purpose. The physicians recognize the importance of a strong vital temperament in the human mother, and I do not see why it does not apply with equal force to the cows.”

FEEDING QUALITIES.

Professor Carlyle, in his address, from which the above paragraph is quoted, adds: "The Holsteins have this vitality and strength. They have the great digestive and assimilative powers required for the production of large quantities of milk from coarse, cheap fodder." In 1864, John H. Klippart, then Secretary of the Ohio State Board of Agriculture, was sent to Europe to study the agricultural methods of its most progressive states. The King of Wurtemberg was then deeply interested in the investigation of cattle breeds, and in the formation of a new breed called the Rosenstein breed. Large estates were devoted to these purposes. The observations of Mr. Klippart in regard to these objects are found in the Ohio Agricultural Report of 1865. I quote from page 210. "But then the North Holland races, (North Holland and Friesland cattle), were desirable for the large calves they dropped and the early maturity of these calves. During the period they were in milk, the cows appeared to be in poor condition but they fattened rapidly when dry; so were the oxen readily fattened. They, however, always required an ample supply of food, but were by no means choice as to the quality of the food, and as they readily crossed with the natives, they were selected as one of the permanent races to be retained on the estate at Weil." This estate was the one devoted to the formation of the new breed, and this breed was used as its foundation. The conclusions I have here quoted were arrived at, from forty-three years of careful scrutiny by highly qualified, and impartial investigators, studying at the same time under their immediate care all the other leading breeds.

Under this head, allow me to again quote Professor Roberts. "Somebody," he says, "away back in the dim past, laid down the rule that 'animals consume food in proportion to their live weight,' but seeing that this would never do, they immediately added, 'other things being equal.' This amendment effectually annuls the rule, for other things never are equal. Can anyone for a moment imagine that two twelve hundred pound well built Shorthorn cows will consume as much as three coarse-headed, gothic-ribbed eight hundred pound ones? The chances are that two of the smaller ones would consume more than the two larger ones. From often quoting this rule and giving little weight to the saving clause, we are likely to be led into error. The truth is, animals never consume food in proportion to their live weight. Age, conformation, inherited constitution, and many other things, have a great bearing as to the amount of food that is required for support. But it is unnecessary to prove what is a self evident fact to all. Believing as I do, I can but recommend that the cow for the dairy be raised on

the farm, that she be of good size, with springing rib, a strong loin, and low flank; that she be closely scrutinized in calf-hood and weighed and measured in early cow-hood; that if she from any way prove deficient, none of her progeny be permitted ever to find a place in the milk or breeding state, no matter how fancy her points, or how long her pedigree."

MILKING QUALITIES.

Quantity of production and persistency of milking are well known characteristics of this breed. I had official charge of the cow Clothilde at the close of her years' record of 26,021½ pounds. She was then giving from 53 to 57 pounds of milk daily. There has been received to the Advanced Register of the Holstein-Friesian Association, 77 records ranging from 15,000 to 30,000 pounds of milk in a year. Dropping her calf at two years old, an average heifer of this breed in good health, well fed and cared for, will produce 6,000 pounds of milk in ten months. She will increase this amount each and every year until she is five years old, when she will give from 10,000 to 12,000 pounds in a like period. The quality of milk will average about 3.5 per cent. fat and about 9 per cent. of solids-not-fat. The nutritive value of the solids-not-fat will be more than equal to that of the fat as in most other breeds, but as in other breeds, the commercial value will be much less. Here allow me to venture a prediction. Science is discovering so many uses for milk solids-not-fat, and not many years hence, their commercial value will be as high as that of the fat. Then will come the hey-day of the dairy farmer.

In 1895, a system of official testing was adopted to determine the capacity of this breed for butter production. It was perfected in 1898. The tests are for seven consecutive days. They are made by agents sent from and responsible to our experiment stations. The fat is determined by the Babcock test and the butter estimated. In cases of extreme large records, re-tests are made. During the last official year 255 such tests were reported. The rules require that they be arranged into seven classes according to the ages of the cows. The number of cows and average products of each class were as follows:

Cows five years old or over, 93, averaging; age, 7 years, 5 months, 2 days; milk, 419.6 lbs.; per cent. fat, 3.43; estimated butter, 80 per cent., fat, 17 lbs. 15.3 oz.; 85.7 per cent. fat, 16 lbs. 12.2 oz.

Cows between 4½ and 5 years old, 12, averaging; age, 4 years, 8 months; milk, 409.4 lbs.; per cent. fat, 3.29; estimated butter, 80 per cent., fat, 16 lbs. 13.3 oz.; 85.7 per cent. fat, 15 lbs. 11.4 oz.

Cows between 4 and 4½ years old, 11, averaging; age, 4 years, 3

months, 7 days; milk, 371 lbs.; per cent. fat, 3.45; estimated butter, 80 per cent., fat, 15 lbs. 15.9 oz.; 85.7 per cent. fat, 15 lbs. 15.8 oz.

Cows between $3\frac{1}{2}$ and 4 years old, 30, averaging; age, 3 years, 9 months; milk, 367 lbs.; per cent. fat, 3.32; estimated butter, 80 per cent., fat, 15 lbs. 2.2 oz.; 85.7 per cent. fat, 15 lbs. 2 oz.

Cows between 3 and $3\frac{1}{2}$ years old, 22, averaging; age, 3 years, 2 months, 25 days; milk, 359.7 lbs.; per cent. fat, 3.39; estimated butter, 80 per cent., fat, 15 lbs. 3.9 oz.; 85.7 per cent. fat, 15 lbs. 3.7 oz.

Cows between $2\frac{1}{2}$ and 3 years old, 25, averaging; age, 2 years, 9 months, 15 days; milk, 308.4 lbs.; per cent. fat, 3.32; estimated butter, 80 per cent., fat, 12 lbs. 12 oz.; 85.7 per cent. fat, 11 lbs. 14.4 oz.

Cows under $2\frac{1}{2}$ years old, 62, averaging; age, 2 years, 9 days; milk, 277.5 lbs.; per cent. fat, 3.2; estimated butter, 80 per cent., fat, 11 lbs. 1.8 oz.; 85.7 per cent. fat, 10 lbs. 5.9 oz.

Here the inquiry frequently arises: "Why use the two factors, 80 per cent. and 85.7 per cent., to convert the fat found in the milk to equivalent of butter?" The latter is used because it is the factor adopted by the Association of American Agricultural Colleges and Experiment Stations, the former because the results reached by it more justly compare with records that have been made by the churn and received in past years to our Advanced Register. We have several hundred of such records sworn to by the owners of the cows and by their assistants in making them. These records are valuable, although made by an inexact method liable to great abuse unless guarded by the strictest practicable regulations. They are the only means we have of knowing the capacities of the great cows of our breed that lived and died before the invention of the Babcock test. During the last six months I have closely examined the butter tests made by the churn that have been reported in the dairy and cattle journals that have come to my desk. My object has been to ascertain the amount of fat, found in the milk, that was required in each case to make a pound of butter. Only a few of such records gave any clew by which this was discoverable. In a majority of tests where it was discoverable I have found that from 75 to 80 per cent. was required, a few required less than 75 per cent., one a trifle more than 70 per cent., a few required over 80 per cent., but none required as much as 85.7 per cent.

SYSTEMS OF REGISTRATION.

In the Netherlands and Friesian herd books, entries of bulls cannot be made before they are stock-getters, nor cows before producing calves. Every animal must also show superior physical development. The entry gives the age and description, including height at shoulders, height at hips, length of body, smallest circumference

of chest and width of hips. In such requirements we recognize provisions against degeneration of the breed. Our American herd books enter all animals of pure blood whatever the age or development. The Advanced Register of the Holstein-Friesian Association of America adopts the European method and adds to it a measurement of width at the thurl (called by anatomists the great trochanter), and a standard record of milk or butter production. In the early history of this association this system encountered great opposition. It is now generally regarded as peculiarly valuable to the breed and to breeders who are active in the advancement of its interests.

AYRSHIRES.

By C. M. WINSLOW, *Secretary Ayrshire Cattle Club.*

The Ayrshire is strictly a dairy cow, originating in the county of Ayr, Scotland, and attracting public attention about a hundred years or more ago. Her origin is veiled in obscurity, and whether built up by judicious selection from the native stock of the country, or the foundation was laid by cross-breeding from one or more foreign breeds, is difficult to determine. There are, however, handed down to us accounts of various importations by the landlords of the old Durham breed, both males and females, and there are many striking characteristics which strongly indicate either a foundation from the old milking Shorthorn or a strong cross from that breed. But, however all that may be, they have been bred for so long in a direct line that their characteristics are fixed and readily perpetuated.

The Ayrshire is a spotted cow with a greater or less proportion of white, red or brown, varying in its proportion with the taste of the breeder. She is a solid, compact animal, weighing at maturity about 1,000 lbs; small, bony head, upright horns, full eyes, large muzzle, thin neck, sharp shoulders, large barrel, broad hips, deep in the flank, giving her a wedge shape. Her udder is capacious, running well forward and back, with teats wide apart, being about three inches long, placed on the four corners of the udder. All appearances of an Ayrshire cow indicate large milking capacity. She is tough and hardy, seldom having anything ailing her, either in body or udder. She has a vigorous appetite, not at all dainty in her food, eating with a relish whatever is placed before her, good or bad.

She is a rapid feeder, and soon getting her fill, she goes to chewing her cud, which she is nearly always doing in a rapid manner—either lying down, standing or walking, and I have often seen them when started into a run, keep on chewing as they ran. If there is any food in the pasture, the Ayrshire will find it.

She is a very uniform and persistent milker, drying off slowly and milking up to calving, if desired. She is quiet and pleasant in her disposition, if kindly treated, or if let alone, but will resent abuse. She is intelligent, quick to learn and of a retentive memory. Can be easily taught to take the same place in the stable, and will always go to that place until removed to another.

She is not easily disturbed at milking time, pays no attention to noise in the stable, and gives her milk as readily to one milker as to another. She is a very economical producer of milk, giving a large amount of milk of good quality for the food consumed. Official tests have shown her to produce 4 per cent. milk at less than two cents per quart average.

The place where an Ayrshire cow particularly excels is in producing milk for the retail trade in towns and cities. It is produced at a small cost, if of good quality for inspection, has a good body to it, and never looks blue; has good keeping quality and will bear transportation without churning or souring; will, after standing over night, easily remix the cream into the milk, and when once re-mixed will not readily rise again.

The milk is particularly adapted for table use and for invalids and children, being attractive looking and evenly balanced in cream and butter-fat, making it a complete food, and easily digested. Another quality of Ayrshire milk is the quality of the curd, which, instead of being leathery and tough, is easily crumbled to pieces, rendering it more easily digested.

People with weak digestive organs, and young children, thrive on it and are uniformly free from stomach and intestinal troubles. While the Ayrshire seems by nature to be particularly adapted to the production of milk to be used on the table and in its original form, still she is no mean butter cow, but as her cream rises slowly, it will be found advisable to use a separator to extract the cream, and when extracted there is no noticeable difference in the churnability of Ayrshire cream from that of any other breed. An average Ayrshire cow will give, on fair keep, from 6,000 to 7,000 lbs. of milk, which will make from 250 to 300 lbs. of butter. Selected breeds, however, will do much better, giving from 7,000 to 8,000 lbs. of milk, and from 300 to 400 lbs. of butter.

We have many well authenticated and official records of single cows giving from 10,000 to 12,000 lbs. of milk, and from 400 to 600

lbs. of butter. While we do not claim the Ayrshire to be a beef animal, or even a general purpose cow, still, as she is of fair size, and an easy keeper, she will at any time pay the cost of raising, if it is desired to beef her. She has heavy hind quarters and thick loins, and butchers always like them because they cut up well and the meat is nicely flecked with tallow, even as a two-year-old. Steers, pure bred and grades, are of fair size, mature early, fatten quickly, and are as profitable for beef as it is possible for a dairy breed to be.

I have seen oxen of this breed and they appeared to be good ones. They were fair size, handsome looking and sprightly, and were said to be tough and enduring.

In concluding, I would say that while the Ayrshire breed has never been pushed into public notice, she is a popular cow with all who know her or have tried her, and she is steadily gaining friends, and I notice that it is very rare for a man to let her go when once he has obtained an Ayrshire cow; and her friends all speak well of her, and she seems to have but few enemies. She is a good, all-round useful cow.

Mr. Peck: Mr. Peck said that while the Holstein, the Jersey and the Guernsey had done much to develop the dairy business, he regarded the Ayrshire as one of the best dairy cows and best adapted to all conditions. That while an admirer of the Ayrshire, he could recognize the merits of the other breeds as adapted to other conditions. Every breed has its weak as well as its strong points, and the dairyman wants to know the weak as well as the strong points. One of the defects of the Ayrshire is that the milk globules do not cream as readily as the milk of the Jersey. This is one of the defects. She is perhaps more liable to milk fever than the Holstein or the Jersey, but the veterinary surgeons have overcome this difficulty until we are able to obviate much of the loss arising from this. She is well adapted to grazing in a hilly country. She is strong, agile as a goat and possessed of a wonderful amount of nerve and vigor. She is one of the best cows for crossing with other breeds. I have found the Ayrshires possessed of great digestive powers, and if any disease gets into the herd, it is never an Ayrshire. There has never been a diseased udder in my herd. She will find food for herself where another cow will starve. She is a persistent milker. As a persistent milker, I do not think she has a superior in any other breed, and she will take on flesh very readily. In the cross of the Jersey and the Ayrshire I have produced the finest cows I have ever seen; they are finer cows and handsomer than either the Jersey or the Ayrshire. I think the cross between the Jersey and the Ayrshire will produce more milk and butter than the Jersey, and the quality is up to the market demand.

THE JERSEY COW.

By E. H. SIBLEY, *President of the Pennsylvania Cattle Club.*

Did the Jersey breed originate, as some have supposed, by the union of the deer and the cow in some dim, musty epoch in the morning-time of the world? Unfortunately, this is one of the questions to which no positive answer can ever be vouchsafed; for in that remote period, no historian was present to record the facts for a curious and interested public at the close of the nineteenth century of the Christian era.

The supposition, however, is a most natural one. The fine, tapering head, the open nostrils, the full liquid eyes, the symmetrical shape, the graceful carriage, the mild disposition, the soft hair and the delicate shadings of fawn of the coat are all both noteworthy and suggestive characteristics.

If we leave, now, the realm of uncertainty and conjecture, and enter the domain of events duly chronicled, we find that as early as 1789 these cattle were so highly esteemed in their native home on the Island of Jersey that an act of the local legislature was passed which prohibited the importation of all foreign bred cattle, and imposed heavy fines on all connected with such a transaction, and provided, furthermore, for the slaughter of animals that had in this way reached the Island, and went even to the length of decreeing the forfeiture of the vessel itself which had brought them thither.

The reason why the Islanders were so anxious to preserve their cattle from being mixed with other breeds was, that the Jerseys were superior to all others as dairy animals. If we search for the causes of this superiority, they may be difficult to ascertain. Many great results proceed from causes so numerous, so subtle and of such peculiar combination that the faithful analyst, after many attempts, confesses the vagueness and the inadequacy of the constituent factors he has arrived at.

It will be generally conceded that the white race is superior to the black, the yellow or the red; yet the white race has reared some of the grandest triumphs of civilization in the same latitude, the same elevation and in the same lands from which they have expelled the native inhabitants, who had utilized practically none of nature's boundless resources. So, while I shall mention a few of

the elements contributing to the success of Jerseys as dairy animals, I may be permitted to hold that there is still something more needed to explain their greatness, and for the sake of convenience, I shall simply designate it as their essential nature.

Jerseys are characterized as being of a highly organized type. They are dairy machines of great power and efficiency.

As helpful factors in the development of Jerseys, the following points may be briefly mentioned:

1. The small size of the Island of Jersey and the enforced economy in the use of land. The total area of the Island is only 62 miles, and, as there are some thousands of land owners, the cattle cannot be allowed to roam about, but are tethered by short ropes, removed several times a day to fresh grass, led to water, and led to and from the stable.

2. The mild climate, which is due to the genial influence of the Gulf stream. The orange and the lemon ripen without protection; the grass is green and nutritious throughout the winter.

3. The division of the land among a comparatively large number of owners, thus affording to these cattle the advantage of being under the master's eye. The inhabitants of the Island of Jersey are designated as "gentry." Their material condition and average intelligence is said to be vastly superior to that of the poorer peasantry of other parts of Europe.

4. The fertility of the soil, which, with other conditions named, insures a high quality of feed. Through a great number of generations, there has been thus acquired or fixed the ability to profitably digest and transform good food into valuable products for the owner.

But a question that is of special importance to us in this country is, "Do Jersey cattle in the hands of American breeders sustain the reputation for dairy excellence which they enjoy at home?" I answer, in substance, as did the Queen of Sheba in reference to the wisdom of Solomon: That the reports current have failed to do the subject justice.

Many a European, who on his native heath might have passed his life in obscurity and poverty, comes to this land of freedom, progress and boundless opportunity, and achieves both fame and fortune. The Jersey cow, during a few generations in the hands of skilful American breeders, while retaining the essential points of quality and adaptation to dairy work, has vastly increased her capacity for usefulness. Jerseys were always noted for their persistency and uniformity as milkers. They have, therefore, for a long time been preferred by prudent managers to other cattle that might give a larger flow of milk in the earlier period of lactation, but that were not the equal of the Jerseys in evenness of production throughout the milking period.

In the face of the numerous records now available, I hope the reproach will no longer be cast on the Jersey that she is a small milker. On the contrary, American bred Jerseys are large milkers when judged by the year, which is the best standard by which to gauge a dairy animal. Moreover, any breed of cattle which will produce a cow such as the one owned by Col. Lewis Walker, of Meadville, viz: Jimp, 86488, that gave nearly 500 pounds of milk in one week, and such a cow as the queen of Miller & Sibley's herd, viz., Adelaide of St. Lambert, 73652, that gave 82 $\frac{3}{4}$ pounds of milk in one day, and over one ton of milk in one month—such a breed, I say, has earned the right, without restriction to yearly totals, to be classed among the breeds that produce heavy milkers.

As regards the yearly yields of milk in the Jersey breed, I may be pardoned for mentioning a few records which deserve wider publicity than they have hitherto received. In the herd of Miller & Sibley, two Jersey cows, Matilda 4th and La Petite Mere 2nd, each gave over 16,000 pounds of milk in one year, while a two-year-old heifer, Fawn of St. Lambert, owned by the same firm, gave within the limits of twelve months ending before she was three years old, over 10,000 pounds of milk. Jersey breeders have paid so much more attention to the quality of the milk than to its quantity that not many milk yields, in comparison with butter yields, have been published; but judging from the herd with which I am most familiar, I should say that there is a large number of Jersey cows that have given with ordinary feed and care and carrying a calf as usual, between 10,000 and 12,000 pounds of milk in a year. Ten daughters of Miller & Sibley's bull Ida's Rioter of St. L., averaged 7,218 pounds of milk apiece as heifers with first calf. It would savor of mere egotism than I trust that you impute to me, if I were to claim that no other Jersey breeders had equally good animals. It is worthy of note that the milk of Jersey cattle when sold for family use commands higher prices than that of other breeds.

But however interesting this phase of the subject might prove, I am warned that to bring this paper within the limits designated, I must content myself with the meagre references already made to the milking qualities of the Jerseys, and proceed at once to discuss her pre-eminent claims as a butter maker. So large is the proportion of cream to the whole milk, that many years ago the owners of Jerseys in this country, began to set the milk by itself and churn it in order to measure the cows' butter capacity. Well authenticated records of tested animals of the Jersey breed, making 14 pounds or more of butter in one week, now amount up to several thousands. They were made in the cold winters in Canada, as well as under the sunny skies of Texas. They were made by the millionaire fancier, and by the working farmer. They were made by college pro-

fessors, and by those who could not write a single page of manuscript without misspelling one or more of the words employed. In short, so pronounced were the merits of Jersey cows as rich milkers, and hence as heavy butter makers, that their merits were recognized by their owners at once, if these owners were possessed of an ordinary degree of the qualities of perception and intelligence.

The American Jersey Cattle Club has accepted, approximately, 4,200 tests of cows making upwards of 14 pounds of butter a week. On an average, one cow in every nine tested makes 20 pounds or more, and one in every sixty-one makes 25 pounds or more, while one out of every 179 tests, 28 pounds or over. In connection with the tests accepted by the club, it should be borne in mind that the blanks furnished for the purpose, require more than forty different details for each cow tested. In those cases in which an employe makes the test, an affidavit is required before a justice of the peace or a notary public, and the owner must certify that he has full confidence in the statement made by his representative. To supply all the points of information demanded by the Club, makes the preparation of the paper a burdensome task to many people. It would seem to the writer a conservative estimate that not over two-thirds of the number of tests actually made have ever been reported on the blanks formulated by the Club. Many people, moreover, have churned separately the milk of a Jersey cow for, say six days, five days, four days, or three days; and finding that the cow made during this period from two pounds to three pounds or more of butter a day, they have been just as well satisfied as to the capacity of their cow as though they had continued the test for seven days; yet no record of any test is accepted by the Club for less than a full week. It is not by any means unlikely that at least one-fourth, and perhaps one-half, as many more Jerseys have shown for a shorter period than that fixed by the Club as the basis of publication, a capacity for butter of two or more pounds a day. For every case of an authenticated butter test of over 14 pounds a week by the churn in any other breed of cattle, the claim would surely be far within the bounds of accuracy that there were ten such butter tests of Jersey cows.

But fortunately for the sake of establishing the supremacy of the Jersey as a dairy and family cow, we are not compelled to rely upon the statements of owners or partisans. At the World's Fair in 1893 there was a contest of breeds, under rules and conditions which had been the subject of consideration and which had been in the process of formation for nearly a year and a half previous to adoption. The meetings for the purpose of determining these rules were called by Hon. W. I. Buchanan, Chief of the Department of Agriculture of the World's Columbian Exposition. The following

clubs or associations were represented at these meetings and assented to the rules finally decided upon: The American Jersey Cattle Club, The American Guernsey Cattle Club, The American Short-horn Breeder's Association, Holstein-Friesian Association, American Devon Cattle Club, Red Polled Cattle Association, Brown Swiss Cattle Association, and American Ayrshire Association. The committee in charge of the tests was composed of men eminent in the line of dairy work. They were Prof. I. P. Roberts, of Cornell University; Prof. S. M. Babcock, of the University of Wisconsin; Prof. H. P. Armsby, of State College, Penna., and Prof. M. A. Scovell, of the Kentucky Experiment Station.

Although accommodations had been provided for all the breeds of cattle represented at the conventions on rules, and although the several associations or clubs had each pledged cows to the contest, yet, as a matter of fact, only three associations actually did produce the cows for the purpose. These three organizations were the American Jersey Cattle Club, the American Guernsey Cattle Club, and the American Short-horn Association.

One of the contests was for cheese and for the solids contained in the whey. The duration of the test was fifteen days, and each breed was represented by twenty-five cows. The Jerseys gave, during this time, over 2,300 pounds of milk more than the Guernseys, and over 1,100 pounds more than the Short-horns. The Jerseys produced 321 pounds more of cheese than the Guernseys, and 374 pounds more than the Short-horns. In the scoring of the cheese as to quality, the Jerseys surpassed each of the other breeds, and exceeded in net profits the Guernseys by \$31 and the Shorthorns by \$38. It required less Jersey milk to make a pound of cheese than of the milk of either of the other breeds.

The second competitive trial was for ninety days, and was for butter, for milk and for the solids other than fat, and included, also, the item of gain or loss in live weight. The results were similar to the ones in the cheese contest, so far as Jersey supremacy was concerned. The Jerseys surpassed their nearest rivals, the Guernseys, by over 900 pounds of butter, and the Short-horns by over 1,300 pounds. In the matter of solids other than fat, the excess of the Jerseys over the other two named was 963 pounds and 714 pounds respectively. In values, the produce of the Jerseys was greater than the Guernseys by \$326; and greater than the Short-horns by \$413. It required less Jersey milk to make a pound of butter than was the case with either of the competitors, and, furthermore, the cost of feed was less per pound of butter produced.

The third test was for a period of thirty days, and in order to accommodate the American Guernsey Cattle Club, who represented that unless their request was complied with they would not be able

to compete, the number of cows in each breed was reduced from twenty-five to fifteen. If there is a certain element of sameness and monotony in the outcome of each of these contests, the writer can only plead that he is not responsible. It is merely another case like that of the small boy in Sunday School, who was suddenly asked by a gruff teacher, "Who made the world?" The reply of the frightened child was, "Please, sir; it wasn't me." So far as monotony goes, I am sure that the competitors of the Jersey did all they could to prevent it, but in vain. In this third test, as in the others, the Jersey again finished at the front, making 113 pounds more butter than the Guernseys, and 174 pounds more than the Short-horns. The net profits of the Jerseys, after deducting the cost of feed, exceeded the Guernseys by \$37 and the Short-horns by \$75.

The three tests already briefly recounted, having cost the Exposition management over \$70,000, the heifer test was reduced in length by Chief Buchanan from thirty days, as originally planned, to twenty-one days. It being optional whether to enter this test, the Guernsey breeders decided not to take part in it. Therefore, only Jerseys and Short-horns participated. In order not to weary the audience, many details have already been purposely omitted; and as regards this last contest, the situation may be summed up by saying that for the fourth time the Jerseys were victorious in yield of milk, amount of fat in the milk, in the amount of butter produced, in the value of the butter and in the net profit per head.

The rules provided for an award for the best five cows of any breed, but the records showed that the Jersey breed was entitled to the honor of having the entire five members.

For further details of these careful, elaborate and impartial series of experiments under the direction of men eminent for ability and character, I respectfully refer any inquirer to the pamphlet on the subject by Mr. Valancey E. Fuller, and published by the American Jersey Cattle Club. This pamphlet, in a compass of fifty-five closely printed pages, sets forth every fact, and notes every particular that the most thorough student or curious investigator could desire.

In view of the vast amount of evidence that is now at our disposal, is it at all surprising that the Jersey cow is daily making hosts of new friends? At one time, she was regarded in this country as a luxury for the rich. To-day, by the logic of events, she has demonstrated herself also a necessity for the poor.



PAPERS READ BEFORE THE

Pennsylvania Horticultural Society

AT THE MEETING HELD IN

HORTICULTURAL HALL, PHILADELPHIA, 1900.



PAPERS READ BEFORE THE PENNSYLVANIA HORTICULTURAL SOCIETY.

GROWING PRIMULA CHINENSIS FOR EXHIBITION.

By JOHN HOBSON, *Gardener to Edward A. Schmidt, Radner, Pa.*

It is a well known fact that every plantsman has his favorites amongst plants. He may grow a great variety and feel an interest in all of them, but there is always a few that have greater attraction for, and that are certain to receive greater attention from the grower.

The primrose I have always thought to well deserve good treatment. I hope I will not be considered egotistical when I say that I am very proud of the fact that for upwards of a quarter of a century I have been invariably successful, both as a grower and exhibitor of this plant.

My treatment is, to sow the seeds in March or April in pots or pans half-filled with drainage in a compost of two parts leaf mould, one part fibry loam, one part sand, the whole to be passed through a fine sieve. After the pots are filled with the compost, they should be watered and allowed to stand for a couple of hours. Then sow the seed while the soil is damp, and cover lightly with sand. I prefer putting the pots in a warm temperature until the seeds come up, but after that grow them in a cool house. If we get pots of the same size and cork the drainage holes, fill them with one-third water, and place the seed pots setting in them, a more numerous and even crop of plants will be the result.

When the young plants have formed a couple of leaves, pot singly in the same compost into two and a half inch pots and keep them shaded for a few days until they become established. Then they may be placed in a position where they will receive plenty of light and air, but no strong sun. When the outside of the balls show plenty of young roots, but before they become pot bound, we re-pot into four-inch pots, and again, when these are well filled with roots, we give a final shift into six-inch pots.

Fine plants can be grown in pots of this size, but when the plants

are extra strong we have sometimes made the last potting in seven-inch pots with fine results.

The soil used for the last two pottings consists of two parts light fibry loam, one part leaf mould, one part decomposed cow manure, and one part sharp sand. I have added to this for the last four years one-fourth Yadoo. The whole compost I pulverized by chopping up with the spade; by this I retain all the fibre, which is a valuable part of the mixture. A frame with a north aspect I consider the best place for them during the summer. In this they can be conveniently shaded during bright sunshine and afterwards have full exposure to the light and air and have the advantage of the beneficial and invigorating effects of the night dew. Bury the pots to the rims in ashes or any other material that will keep the roots cool. Towards the end of September they may be removed to the greenhouse and placed near the glass. The foliage is damped once a day in fine weather with the hose or syringe and grown in a night temperature of from 45 to 50 degrees during winter. When they fill the pots with roots we give liquid waterings once every 10 days of a mixture of English soot, sheep manure and cow manure. We vary this occasionally with sprinklings of bone or Thompson's manure. With a view of giving room to the free development of the trusses, I peg down the leaves and leave the centre open.

The *Primula* is generally infested during summer with thrip and green fly on the leaves. Fumigations with tobacco or dipping the plants in a solution of lemon oil and water will destroy them. Small grubs sometimes bore into the stem at the base of the plant, doing much injury. A couple of pinches of slaked lime put on occasionally will get rid of them. There are several fine strains of *Primula*. The plants exhibited by me at our February meeting were of the Williams strain. This variety I have been growing for nearly thirty years and I don't think that any of the newer kinds are superior for exhibition purposes.

TWELVE BEST HERBACEOUS PLANTS FOR THE AMATEUR.

By JAMES BOYD, *Haverford, Pa.*

To name the "Twelve Best Herbaceous Plants for the Amateur" is indeed a difficult task for a true lover of flowers. It would be much easier to name fifty, and in turning over in my mind the mer-

its of my many favorites, I have tried to select only those that are perfectly hardy and easy to cultivate. I have also chosen a fair proportion of low and tall growing plants and have tried to make the list cover the season from early in the spring until late in the fall. They are as follows:

Arabis Albida. This pretty rock-cress is of the easiest culture, grows only about five or six inches high, and puts forth its fragrant white flowers in April so profusely as to completely hide the foliage. It is a neat little plant, likes the sun, and is easily increased by division. It does well in rockery or at the edge of border.

Iberis Sempervirens. This pretty candy-tuft has clean evergreen foliage which is completely hidden with large white flowers early in May. It is perfectly hardy in this section, requiring no protection, and if soil is not too heavy, will seed itself. The *Gibraltarica* variety is considered by many to be prettier, but it is not as hardy as the *Sempervirens*.

Iris Germanica. The German Iris is a very satisfactory plant in every way. While, perhaps, not quite as beautiful as the Japanese Iris, it requires no special soil or protection, and is therefore much easier for the amateur to grow. There are many named varieties, and if I could choose but one, I should select the *Iris Pallida speciosa*, which, I believe, is the same as "Mlle. Almira," and has light blue flowers of immense size. It will grow almost anywhere, but prefers the sun, and should be divided and transplanted every three or four years.

Papaver Orinetale. These beautiful showy poppies have handsome foliage and do well in common garden soil. They are very hardy, produce their gorgeous flowers in May, and will sow themselves. All of them are fine, but if I had to make a choice, I should take "*Parkmanii*," which is of deep scarlet with a black blotch at the base of each petal. They give excellent effect amongst shrubbery.

Veronica Rupestris. This pretty creeping "Speedwell" grows only three or four inches high; flowers late in May and makes a beautiful sheet of blue. It is exceedingly pretty among rocks, and a few evergreen boughs thrown over it in the fall will keep the foliage fresh and green, ready for an early start in the spring.

Paeonia Officinalis Rubra Plena. All of the herbaceous paeonies are beautiful and satisfactory plants for the amateur to grow. They improve with age, are perfectly hardy, and their bright, glossy foliage makes them attractive even when the bloom has passed. If I could only select one, I should take the plant named. It has double brilliant crimson flowers, which are borne in great profusion in May. Paeonies make a fine show when grown in a mass.

Correopsis Lanceolata. This well-known plant is a mass of golden yellow flowers in June. It succeeds in almost any position, but I find it better to raise new plants from seed every second or third year, as I get more bloom from two or three year old plants than from older ones. It will seed itself where soil is not too heavy. A mass of these makes a beautiful show.

Delphiniums. These hardy larkspurs produce their long spikes of flowers in June, and if the flower stems are removed, a second crop may be expected late in the summer. They are all beautiful and most of them are easily grown. When cut down at winter's approach, if the crowns are covered with coal ashes, they are protected from the weather and from snails, which sometimes prove very troublesome. If I had to select one, I should probably choose "*Formosum*" with its long spikes of beautiful deep blue flowers with white eyes. This, however, is not quite as hardy as some of the other varieties, but well repays a little extra care and attention, such as a forkful of long litter late in the fall. It is well to divide and transplant them every three or four years.

Phlox. The dwarf perennial phloxes are certainly very beautiful and desirable. By removing the flower stems as soon as the first bloom has passed, a second crop is generally secured, and a slight covering after the ground is frozen in the fall will insure their appearance the following spring. There are many colors from which it would be very difficult to select a single one, but I consider that none are finer than "*William Robinson*," which has large flowers of a salmon rose color with dark centres.

Hollyhocks. These old but fine plants have always been garden favorites. For many years, however, they have been troubled with a disease which has made them unsightly, and for this reason they have lately been much less grown. Different preparations have been recommended to cure this trouble, but the ordinary amateur has neither the time nor inclination to bother with such, and if he is unfortunate enough to have his plants infected, he had better destroy them at once by burning and start a fresh crop in another part of the garden. Hollyhocks are easily raised from seed, and young plants are not as subject to the disease as older ones. The "*Allegheny Hollyhock*" is a beautiful fringed, semi-double flower and does not seem to be affected by disease. It is certainly one of the finest herbaceous plants we have, and ought to be in every collection. They are strong growers and the flowers show many beautiful shades. It is well to plant them near a building or a fence to protect their tall, flower-laden stalks from the wind.

Rudbeckia "Golden Glow". This plant is of a vigorous growth and produces great quantities of golden yellow double flowers late in the summer. It grows from five to seven feet high, according to

the soil, and increases rapidly. I find it does better if divided every second or third year. Several small clumps planted in well enriched soil around a stout stake or post four or five feet high makes a beautiful sight late in summer. The stems can be tied around the post so as to entirely conceal it, and the flowers extending above the top of the post, droop in every direction like a fountain of gold.

Anemone Japonica, "Queen Charlotte." This beautiful plant is one of the last to bloom in the garden. It commences to flower early in September and continues to put forth its large semi-double white flowers tinged with pink until cut down by hard frost, and it takes quite a hard frost to knock it out.

The twelve plants named, cover the season from April to November, inclusive. Three are low growing, six of medium height, and three tall. Two of them are white and the others embrace shades of red, yellow, pink and blue. Seven of them are good for cutting. None are so rare as to entail much expense or trouble in procuring them—and all are perfectly hardy.

I am well aware that I have not mentioned many beautiful herbaceous plants that are equally as fine as those I have named, and some of my professional friends may think I have much to learn in regard to perennials, but I venture to assert that any amateur who starts his garden with the plants I have named will, if he has any love for flowers, be so well pleased that he will quickly wish to double or treble his list.

CULTURE OF CALCEOLARIA HYBRIDA.

By WM KLEINHENRY. *Gardener to P. A. B. Widener, Ogontz, Pa.*

There are two distinct classes of *Calceolarias*—those known as shrubby are used in some parts of Europe for planting out in summer time, and there are the herbaceous or hybrida varieties. It is of the latter class, which is the better for pot culture, that I will talk to you about this evening.

They are grown from seed, and the best time to sow the seed is in the months of July and August. The seed should be sown in pans or small boxes in a mixture of even parts of well decomposed sod, leaf mould or peat in which some sand has been mixed. Care should be taken to choose a shady situation for the seed pans and as cool and airy as possible. After the plants are well up, they

should be pricked off as soon as large enough to handle, again using pans or small boxes; this time using two parts well decomposed sod and one part leaf mould and a little sand. After a day or two of careful shading, they should be gradually given air and a position selected as near to the glass as possible. When strong enough they may be potted into two and a half inch pots and placed in a frame outside, if possible, with the sashes elevated sufficiently so that a free circulation of air may be assured at all times when the weather is favorable. In the outside frame they may remain until cool nights set in, by which time they should be large enough to be repotted into three-inch or four-inch pots, according to the strength of the plants. By following the method recommended, some of the very largest will become sufficiently large to occupy a seven or an eight-inch pot to advantage.

The temperature in the winter months for these cool greenhouse plants should, whenever possible, be kept down to from 45 to 50 degrees in daytime, and at night from 42 to 45 degrees.

The greatest care must be exercised in the watering, especially in the winter-time. They suffer a great deal if allowed to become too dry, and one overdose of water will almost kill them.

Its greatest enemy in the insect line is the green fly. To overcome this trouble, tobacco stems must be liberally placed between the pots.

This is the method I used last year and had very good results. I had in the months of April and May plants full of bloom, growing in six-inch pots two feet across, and they were grown in a natural way without training, which surprised many of my gardener friends who called to see them. In the collection of over three hundred plants, it was hard to find two alike, so varied were they in their shadings and markings. Among them were some very nearly clear white; one was a pure canary-yellow, and again one was a canary-yellow with large spots very nearly black.

I hope, with the brief cultural directions given, that my fellow gardeners will take them in hand and make an effort to grow them, for nothing, in my opinion, gives more pleasure than a collection of well grown *Hybrida Calceolarias*.

THE CULTIVATION OF SWEET PEAS.

By WM. ROBERTSON, *Gardener to John W. Pepper, Jenkintown, Pa.*

In accordance with the recent resolution adopted by this society, that winners of prizes should give an account of their methods of growing the exhibits, I have prepared a short paper on Sweet Peas.

It has been my practice to prepare the ground thoroughly in the fall, and to sow the seed early in the spring, as follows: In November, dig a trench 10 inches wide and one foot deep. Then put four inches of well decayed horse manure in bottom of trench, tramp it firm, and put two inches of soil on top of this manure. Then give a liberal dusting of pure bone meal, and cover this with rough soil, and let the trench remain in this condition until spring.

Sowing the Seed. This depends greatly upon the weather and condition of the ground, but the seed should be in, not later than the middle of March. Should the soil in the trench be too wet, take some dry soil from the shed, and put one inch of this in the trench. Sow the seed and cover with one inch of dry soil.

The white varieties are more liable to rot and should not be sown before April 1st; these varieties also require dryer soil than the other colors. These two conditions must be strictly carried out in order to have success with white sweet peas.

It is a good plan to have a ridge along the side of the trench to prevent surface water from running into the trench. Do not fill up the trenches with soil while the vines are growing. Allow a slight grade down into the trench, and by keeping the ground cultivated, the spring rains usually wash all the soil into the trench which is necessary to be about the vines. As warm weather appears, use a mulch in the trench, and give a good watering as the ground gets dry.

This has been my method of cultivation, and its success can be seen from the fact that I have been awarded first prize for three consecutive years, in the competition for the Henry F. Michell prizes, for best general display of sweet peas exhibited before this society.

It is advisable to sow named varieties, in order to secure a full collection of the grandest blooms.

In my opinion the following varieties are the leaders in their different colors:

Pink—Blanche Ferry, Katherine Tracy, Miss Hunt, Princess Beatrice, Apple Blossom.

White—Blanche Burpee, Queen of England.

Red—Cardinal, Firefly, Splendor.

Blue—Navy Blue, Countess of Radnor, Monarch.

Yellow—Primrose, Mrs. Eckford.

Orange Pink—Lady Mary Curry.

HOW TO PREPARE AND PLANT A PERMANENT ASPARAGUS BED FOR PRIVATE USE.

By JOSEPH HURLEY, *Gardener to J. M. Rhodes, Ardmore, Pa.*

Asparagus is a vegetable that ought to be in every private garden; therefore, it is one of those things the planting of which should not be put off from year to year, but should be done just as soon as the property has been secured and the owner has made up his mind to build his home.

A great many people are deterred from planting an asparagus bed because it takes so long for it to come into bearing; hence the greater the necessity for starting at once.

LOCATION.

Having made up your mind to plant the asparagus bed, the next thing to do is to choose a good location, and by that I mean one with a southern exposure and sufficient fall to carry away all surplus water. On flat, level land, where the water is apt to lay, you can help it considerably by putting broken stone about one foot deep in the bottom of the trenches. This will keep the water away from the crowns at all times.

PREPARATION OF BED.

For a good and lasting bed of asparagus, it is necessary to prepare the ground thoroughly by digging the whole bed over to a depth of at least four feet. First remove all top soil one spade deep and cart it away to a pile close by the bed, so as to have it handy when the bed is dug over, to spread again over the surface. You now proceed to open your first row. This can readily be done by carting the dirt over and beyond where your last row is to be;

then put in the bottom of the trench a layer of manure six inches deep, then a layer of dirt off your next row; again a layer of manure, and so on every other layer of manure and dirt until you have the whole bed dug over.

When digging, keep a sharp lookout for stones, and remove all of them, no matter how small, as they will interfere with the cutting; especially so if you want white grass.

SOIL.

The best soil for growing asparagus is a rather light, sandy soil. Not only will it produce you the nicest heads, but it will produce three heads to the one that you will get from a heavy clay soil. I would recommend that wherever the soil is not naturally light that it be made so in preparing the bed by mixing sand or some other light material with it.

PLANTING.

Having had the whole bed dug over, we now start to dig trenches for the plants. These should be dug twenty inches deep and four feet apart, and the plants in the row not less than three feet; and where room is no object I would recommend putting the plants four feet apart in the row and covering the crowns to the depths of two or three inches.

Spring is the best time to plant; do not do it in the fall, as the crowns will rot, or at least nine-tenths will, so you will have to re-plant in the spring after all.

Two-year-old roots are generally used, and I would advise anyone planting a bed of say five hundred roots, to order from the nurseryman at least one thousand and pick from them the strongest crowns and those that have been the least injured, and throw the remainder away.

TREATMENT.

All that is necessary to do the first year is to keep the bed free from weeds; this will have to be done with the hoe. Care should be taken that there is not too much soil hoed off the banks, as it all drops into the trenches and is liable to smother the crowns.

The second year the treatment is about the same as the first, except that you can go a little deeper with the hoe. Each time you hoe you can pull a little soil off the banks around the growing plants, so that about August, when you have hoed for the last time, you will have about twelve inches of soil above the crowns.

In the third year, if you have succeeded with your bed, you may begin cutting, and from time to time as the bed requires digging,

you can keep adding a little more soil off the banks to the crowns, so that by the middle of June, when you have let it grow for the season you will have your bed level on the surface.

CUTTING THE GRASS.

Cutting the grass should always be done by the same man, and wherever practicable, I would recommend that it be done by the gardener; and if he has not time to do it, then he should select the most trustworthy man he has under him, for it requires good judgment, especially when you are cutting white grass, for if you are not careful in observing the proper angle at which you insert your knife you will cut off the young shoots that have not yet appeared above the ground. By having the same man cut the grass every day he becomes familiar with every crown in the bed and he will soon learn the proper way to insert the knife. Of course, where green grass will do, so much care is not necessary in cutting.

GENERAL REMARKS.

Two or three applications of salt during the cutting season will be very beneficial not only in helping to keep the bed free from weeds, but I think it improves the quality of the crop.

Early in November, when the summer's growth has ripened, and before the seed has a chance to drop, the bed should be cleaned by cutting away the stalks with the scythe and burning them up. The bed should then have a good top dressing of well-rolled cow manure from three to four inches deep, free from straw, so that it will dig in nicely in the spring. The bed should be dug carefully in the spring as soon as the ground is dry enough and before the young shoots appear. A dressing of ground bone, or soot, or in fact any commercial fertilizer, applied in the spring, will be very beneficial to the crop.

The old adage: "Whatever is worth doing is worth doing well," applies to asparagus more than to any other crop. And if you take good care of your asparagus bed it will take good care of you for ten weeks in each and every year.

PAPERS READ AT THE ANNUAL MEETING

OF THE

STATE HORTICULTURAL ASSOCIATION
OF PENNSYLVANIA,

HELD AT

PITTSBURG, PA., JANUARY 16 AND 17, 1900.



STATE HORTICULTURAL ASSOCIATION OF PENNSYLVANIA.

PAPERS READ AT ANNUAL MEETING JANUARY 16 AND 17,
1900.

REPORT OF GENERAL FRUIT COMMITTEE.

By H. C. SNAVELY, *Chairman.*

It was well on in December when I was assigned the duty of preparing the report of the General Fruit Committee. I had prepared and sent out the blanks for reports as speedily as possible, and quite a number of the members of the committee and others to whom the blanks were mailed responded promptly. The reports from the various counties are not as full as a year ago, when almost every county in the State was reported. The reports in my hands, however, cover every section of the State, so that a fairly accurate report can be made up of the results of the past season.

Generalizing these local reports upon the different varieties of fruits, as well as other pertinent matters, I report as follows:

APPLES.

Taking the State over, the conditions were favorable for a good yield. The quality of the fruit, as a rule, is reported good. The greatest injury to the crop, it appears, occurred during the dry and very warm weather in September and October. In some instances the fruit was scalded on the trees, and in nearly every report the complaint is that the warm weather ripened the fruit prematurely and impaired the keeping quality.

No causes are assigned for the failure of the apple in about eight or ten counties of the State.

It appears that the northeastern part of the State had a good crop. The north central part light, the northwestern part a good crop, the southwestern part a short crop, while the south central

and southeastern portions of the State produced a large yield. It is reported that out of one town in Susquehanna county there were shipped over \$31,000 worth of apples.

Prices of apples varied from 15 to 75 cents per bushel. In sections where the yield was large, it seemed for a while as if there would be no demand at all for the fruit, while portions of this State, as well as other sections of the country wanted the fruit and were willing to pay the growers remunerative prices.

We collect these facts four or five months after it can be of any practical use to anyone. Why can not this association or our Department of Agriculture gather these crop statistics at a seasonable time of the year, publish and send them out promptly, so that all may know before or during the time of harvesting the crop where fruit is plentiful or where it is a failure? Usually it would be a means to prevent fruit from going to waste or leave the grower at the mercy of the buyers on the one hand and on the other hand those wanting fruit could know where to get it. Such an arrangement would prove beneficial to all. The United States Department of Agriculture gathers up these crop reports from all over the country and issues monthly bulletins, and the wide-awake farmer surely profits thereby.

Years ago I urged upon this association the possibilities of Pennsylvania as an apple growing state, and as the years went by the possibilities became clearer and brighter, but no systematic, intelligent efforts were made to promote this industry. This association was the pioneer in the work, and a large balance stands to its credit. The work of its members was disinterested. I ask, now, Mr. President, has not the time come when it is a plain duty for the State to aid in the advancement and promotion of an industry that will so much contribute to the welfare and wealth of the people.

PEARS.

The yield of the pear crop was not as satisfactory as last year. A year ago, while the apple crop in the State was a failure, fifty correspondents reported a good crop. This year sixteen correspondents report a good crop, seventeen a medium or fair crop, and twenty-five a poor crop.

The cause assigned for the failure is cold weather in winter and spring, while blight still prevails to a large extent. Some report trees about all killed by blight, including the Kieffer.

Whenever mention is made, prices were, as a rule, fair for this fruit.

PEACHES.

In 1898, a short crop was reported, but the results of the past year (1899), were disastrous. Peaches were next to a total failure. Only in a few counties has any of this fruit escaped the abnormally low temperature. These will appear in the notes from the correspondents.

Peach yellows seems to be as destructive as ever, and with the loss of two successive crops, peach growers have become disheartened.

The low temperature in January and February caused the failure of the last crop.

PLUMS.

Of this fruit, the Japanese plums appear to be largely in the lead, and but for this class of plums, the crop would have to be reported a failure. The Wild Goose bore prodigious crops the past summer. Fruit of this variety can be had every year if other varieties are grafted into the trees to insure pollination. It must be remembered that the flowers of the Wild Goose are usually dichogamous.

It has been claimed that the Japans are exempt from the black-knot. This claim does not hold good, for I observed black-knot on Abundance trees. Since the Japans are doing better than others, I presume they will be planted to the exclusion of something better, but I predict that he who can go on the market with Prince Engelberts or German Prunes will have the call.

QUINCES.

As usual, quinces are reported a failure. The reports say poor, scabby, knotty, wormy. Less than a dozen correspondents report a satisfactory crop.

One correspondent writes that he literally whitewashed his trees with Bordeaux mixture, and the fruit was perfection.

CHERRIES.

More than three-fourths of the correspondents report a good or large crop of cherries. The sour cherries and the native black cherries appear to do best. Crops of the larger and finer fruit are frequently lost by rotting. This can be prevented in most cases by a thorough spraying with the ammoniacal solution just about or before the fruit begins to color.

Of the sour cherries, Early Richmond is mostly mentioned, and of the sweets, Gov. Wood, Black Tartarian, and Yellow Spaniard are the general favorites.

GRAPES.

Last winter proved very destructive to the grape vine. In many instances the vines were killed down to the ground. In others, the buds were damaged. While this obtained to a considerable extent, it was not general, for some correspondents report crops of the best quality.

It seems that thorough spraying of the vine is essential to secure perfect fruit. The Concord still stands at the head. Niagara, Moore's Diamond and Worden are frequently mentioned. Campbell's Early seems to be disappointing.

SMALL FRUITS.

The majority of the correspondents report a satisfactory yield of small fruits, especially the strawberry, but prices were generally too low to leave a margin on the venture.

In many instances the canes were winter-killed of the raspberry and blackberry.

Drouth in some localities cut the raspberry yield.

VEGETABLES.

About two-thirds of the correspondents report conditions favorable for vegetables. In fact, only a few speak of this crop as a failure. Either the early summer or late summer was satisfactory in nearly every instance. Potato blight was probably more destructive than usual, and it seems that Bordeaux mixture, even though applied early and often, did not save the vines.

STRAWBERRY PLANTS AND FLOWERS.

There is obviously constant progress in the planting of shrub-beries and flowering plants to adorn the country home. True, it is not general, but by the introduction of nature studies in the schools, the homes of the rising generation will be adorned with flowers and plants. And this is as it should be, for no people should be more lavishly surrounded by the beautiful in nature than the dwellers in the country.

SPRAYING FOR FUNGI AND INSECTS.

With few exceptions, the benefits resulting from spraying for insects and fungi are conceded; but, judging from the reports of correspondents, it is not practiced to a great extent; not to such an extent as would prove profitable to the fruit growers of the State. Reports come from portions of the State that the crop was large, of good size and color, but very wormy. Now, a wormy apple is never a first class apple, no matter how large or finely colored. To attain

satisfactory results with grapes, it seems spraying is necessary; spraying early and often with fungicides is the price one must pay for fine grapes in most of the sections of the State.

In general, good judgment is required as to when and how often an orchard or a vineyard, or in fact any kind of fruit, should be sprayed.

FERTILIZING AND CULTIVATING.

While spraying is an essential to success, the proper feeding and cultivating of orchard, vineyard and small fruits can not be neglected. The vigor and productiveness of trees and plants is in proportion to the available plant food in the soil, and the tillage given to enable the plant to utilize it.

Trees under such conditions are better able to produce crops under unavoidable adverse conditions.

GENERAL OBSERVATIONS BY CORRESPONDENTS.

L. W. Lighty, East Berlin, Adams county, reports the York Imperial apple as one of the best keeping and selling apples. Pears, a short crop, except Kieffer, which sold at good prices, but the aftermath was a full crop of profanity. Mr. Lighty says he never finds new varieties of strawberries to pan out according to originator's descriptions. Cumberland still a leader in his section, with Haverland a good second. Spraying is practiced to a considerable extent, but usually without satisfactory results, which may be due to improper application or at the wrong time.

D. P. Forney, Hanover, York county, says of spraying: Not generally practiced, but where carefully done is of great benefit. Pear blight destructive.

J. S. Burns, Clinton, Allegheny county, reports pear blight very destructive. The fruit crop in quantity and quality was way below that of 1898.

Oliver D. Shock, Hamburg, Berks county, reports a very large crop of apples of fine quality. Smokehouse more abundant and finer than ever before. Mr. Shock says that even now (Christmas), farmers are only getting from 30 to 35 cents per bushel. Price of berries ruled very low.

Cyrus T. Fox, Reading, Berks county, reports the largest apple crop in a number of years. Fruit of fair quality. Of plums, the

Japans and German Prunes did the best. The cherry crop was so large that it is feared it may take several years for the trees to recuperate. The crop of small fruits, especially strawberries, was so large that prices were unremunerative. The grape crop was good and as usual, Concord was the leader, though fine Eatons were grown. Hundreds of barrels of wine were made of the Clinton and Iris. The season was favorable for a large crop of vegetables, and prices were low. Spraying for fungi and insects is better appreciated and understood, and many are providing themselves with outfits for the work.

H. L. Harvey, Duncansville, Blair county, reports a good crop of small fruits, and bringing good prices in the Altoona market. Not much spraying, but where done results are good.

R. M. Welles, Towanda, Bradford county, reports the apple crop good as a whole, but not general. Fruit quite wormy and not keeping well. Idaho pears rotted badly. Japan plums he considers reliable. Notwithstanding the low temperature for twenty days in February last, no injury was done to Japan buds. He regards the English Morello the most reliable cherry. Black Tartarian and Yellow Spanish rot badly. Buds and vines of the grape were injured very materially. Buds and vines of the Niagara, Empire State, Brighton and Brilliant were killed, while Concord, Worden, Jessie, Lady, Moore's Early and Moore's Diamond passed through the winter in fairly good condition. He pronounces the Diamond a fine, hardy grape. Of Campbell's Early, he says: "It grew and bore well, but had very loose, open clusters and did not ripen on account of rust and mildew." He says: "My experience is, that to succeed with nearly all kinds of fruit, I must spray, spray, spray, persistently." For apple tree moth, he says: "I put heavy paper bands around my large Fameuse apple tree, removing them weekly, killing the apple moth worms underneath, then replacing the bands. I killed hundreds of the worms and had to keep it up for six weeks."

W. H. Moon, Morrisville, Bucks county, reports a much larger yield of apples than usual. Unsprayed trees produced fair and fine fruit. Japan plums will likely be the most profitable.

E. H. Cocklin, Cumberland county, reports an immense yield of apples, of good quality and keeping well. Of plums, the Abundance, of the Japans, and the Prince Engelbert, of the Europeans, succeed the best. Of grapes, Concord and Niagara are the best. Munson's seedlings unsatisfactory. Strawberries a fair yield; have not found the ideal strawberry yet. Spraying for grape rot and the codling moth has given good results.

Jacob L. Rife, West Fairview, Cumberland county, says of cherries, that the Ida, Black Tartarian, Cumberland and Early Richmond are the best varieties in his locality.

Gabriel Hiester, Harrisburg, Dauphin county, says the peach crop

was a total failure, except one variety, name unknown; resembles the Melocoton type, which average five baskets per tree of excellent fruit.

L. G. Young, North East, Erie county, reports the grape crop as the largest and best ever grown. His town shipped one thousand cars. Of plums, he prefers the Lombard, Shipper's Pride, Moore's Arctic and the gages of the European type, and Abundance, Burbank and Red June, of the Japans. Of peaches, he reports all varieties winter-killed, except Alexander, Nager, Hill's Chile, Crosby, Lewis & Hine's Surprise, which produced a good crop. Mr. Young adds that on the whole their experience for 1899 was satisfactory, and says this may be the explanation: "We give our trees thorough cultivation and care, using potash freely, as well as ground bone."

C. W. Good, Waynesboro, Franklin county, reports from near Mason and Dixon's line, and what he says is of interest, especially for his section of the State. "Speaking for myself and family, we have had a season of the finest fruit products that it has ever been our duty and pleasure to be thankful for. Apples were in the lead by far. We are now eating Kennards, Starks and York Stripes. Later we will attack Gibbs, Delaware Red Winter, Lancaster Greening, Albemarle and such. Later still, sometime next summer, Mentzer after Lumbertwig and some others. No Ben Davis in our bill-of-fare. York Imperial, Grimes Golden, Winesap and Mickley's Rambo were so good we could not keep them on account of buyers' inclination toward them." Mr. Good adds that he did not get hungry or dry enough to try the Kieffer pears the past season.

Geo. N. Owens, Birmingham, Huntingdon county, reports insect pests on the increase. Little or no spraying in his section. He says: "I tried lights among the trees at night last season and feel encouraged to make further efforts along that line."

Daniel D. Herr, Lancaster, Lancaster county, puts the Cumberland raspberry at the head of the list for size, quality and hardiness. The Kieffer pear is still at the top, while the York Imperial apple is planted largely, it is giving way to the Ben Davis, Stark and Gano. The Japan plums are holding their own and are really the only varieties worth planting in his section.

W. P. Brinton, Christiana, Lancaster county, says quinces were more plentiful than usual and of better quality. Pears above an average crop, but in some instances the San Jose Scale marred the appearance of the fruit.

W. B. K. Johnson, Allentown, Lehigh county, reports a heavy crop of Johnson quinces; he sprayed heavily with Bordeaux mixture—so heavily that the tree had the appearance of being white-washed. The result was a crop of perfect fruit. Of strawberries, Glen Mary, Bouncer, Bubach and Gaudy did best. The favorite blackberry is

the Allen, a seedling of Early Harvest. He notes that pear trees are dying as a result of the low temperature last winter. Lehigh county had about 20 per cent. of a peach crop. Spraying on all kinds of fruit is necessary to keep control of insects and fungi.

P. Sutton, Exeter, Luzerne county, says the apple crop was large, but quality poor. The scalding hot sun damaged apples greatly and literally ruined some varieties. Baldwin are full of brown specks all through, and scarcely more than one in ten is fit for use. He says he finds it pays to thin out apples, pears and plums. Fruit on properly thinned trees attains twice the size. Of sixty varieties of strawberries in cultivation, he singles out Glen Mary, Wm. Belt, Pet, Hall's Favorite, Clyde and Margaret.

D. C. Young, Smethport, McKean county, says Concord is the only grape that thrives in his locality. Apples do well, and also pears in sheltered locations. Strawberries, raspberries and blackberries grow naturally in profusion, and when cultivated, the yield is remarkable.

A. B. Greenlee, New Lebanon, Mercer county, says nearly all varieties of apples grew very irregular in shape. Fruit free from scab. Much damage from the codling moth, and most by the second brood in August and September. Blight attacks all kinds of pear trees, Kieffer included.

Howard A. Chase, Philadelphia, reports for northern Monroe an average crop of apples of the best quality and a good demand. Of plums, a full crop of Japans, Red June, Abundance, Burbank, Chabot and Satsuma. Of grapes, Moore's Diamond is one of the best for home use.

Jno. P. Fredd, Pottstown, Montgomery county, reports peach yellows very destructive. Japan plums succeed best, but consumers are rather shy of them.

S. S. Shimer, Easton, Northampton county, reports a half crop of peaches in some of the orchards; in others none. Baldwin and Smith's Cider the leading apples.

S. M. Meehan, Germantown, reports a fair ordinary crop of peaches in his locality. Good crops of grapes when bagged or sprayed. Poor results without. Spraying is becoming general with the intelligent fruit growers and is conceded to be beneficial.

E. O. Austin, Austin, Potter county, says: "Pear blight has destroyed many of our high bred trees, but seedling trees, producing fruit of fairly good quality are never injured." The unprecedented drouth and terrible heat in September and October injured the apple crop. A few orchards on very high ground produced enormous crops. Cabbage club root has rendered the growing of cabbage impossible in the best gardens.

C. W. Brodhead, Montrose, Susquehanna county, reports a very

good yield of apples, and says an item in a country paper states that \$31,000 was paid out for apples at Montrose last fall. The growers receiver \$1.00 a barrel, the shipper furnishing the barrel. Notwithstanding this showing, the orchards are not pruned or cared for as they should be. But little spraying, and much wormy fruit.

W. H. Stout, Pinegrove, Schuylkill county, says spraying is necessary; benefits unquestioned. It is difficult to get good crops of fruit in his locality with about all the insects and fungous growths in the long catalogue to contend with. Yet the market the past summer was overstocked and prices ruled very low.

S. M. Baker, Brookfield, Tioga county, says spraying and other attentions to trees neglected, consequently but little good fruit. Scabby and wormy fruit is plenty enough.

Pressley Leach, Burgettstown, Washington county, says: "We sprayed two of our orchards last spring and the other three we let go without spraying. The two we sprayed had a good crop of good apples, and the other three had very few apples and the fruit very inferior. He further states that those who spray have fruit and the unsprayed orchards fail to produce.

Theodore Day, Dyberry, Wayne county, reports the apple crop the largest ever grown, but pears a very light yield. A few peach trees bore, standing on high dry land exposed to the winds. Mr. Day proposes to introduce disease among the caterpillars; he has done this twice before.

A. Ruth, Scottdale, Westmoreland county, says blight has killed about all the pear trees except the Kieffer and the Early Katharine. Of spraying, he says not much practiced and no success. Advocates keeping hogs in orchard to eat up wind falls and wormy fruit.

Prof. S. B. Heiges, York, York county, says that apples from unsprayed trees are not keeping so well. The comparative failure of the pear he attributes to the low temperature last spring.

Col. J. A. Stahle, Emigsville, York county, says the Haverland strawberry bears immense crops and to some extent supersedes the Cumberland. Under the head, shrubbery, plants and flowers, he reports: "Splendid; our roadsides are covered with wild and cultivated sorts."

H. G. McGowan, Geiger's Mills, Berks county, says that Dr. Funk, of Boyertown, had a fair crop of peaches. He says with them the question is how to keep apples. Cellars are too warm, caves seem to be failures, and cold storage too expensive.

J. N. Pyle, Willowdale, Chester county, reports an immense crop of apples of remarkable size, considering the overloaded condition of the trees. Good crop of pears. Peaches nearly a failure; a few trees bore a fair crop; these stood in sod and were heavily mulched

with corn fodder. Those who bagged or sprayed their grapes had fine crops; where not practiced the rot did great damage.

Jno. F. Boyer, Mt. Pleasant Mills, Snyder county, reports some peaches in his section. He says: "I had prospects for more peaches than any man in this State last summer, but on the 19th of July a hail storm struck our place and in less than thirty minutes I lost five thousand dollars. The entire peach crop was gone." He adds that nearly all his other crops were ruined at the same time.

Jos. H. Paschall, Ward, Delaware county, says: "Many of the apples were stung by the curculio before the bloom was all off, and made permanent blemishes. We don't seem to have any effective means of fighting this insect." He speaks very highly of the Pyle apple, and says it might be taken for a York Imperial, only that it has better shape, size and color. In his opinion it is an acquisition that ought to be disseminated. A large crop of plums, the common blue doing the best. Of spraying, he says one great advantage is in keeping foliage in a healthy condition.

Jos. W. Thomas, King of Prussia, Chester county, reports a large crop of fine apples. Large crop of pears and plums. A fair crop of peaches.

Mr. Chase: If in order, I would state that I do not think this report should be filed without commendation for its excellence. I think these reports should be prepared and published in the autumn when the information contained might be of more practical value. Probably some arrangement might be made with the Department of Agriculture to have the information compiled and promptly published by the Department.

Mr. Johnson: As far as disseminating a knowledge of the Pennsylvania fruit crop is concerned, it would be a good idea. However, the information would be only local, and would give no idea of the crop at large throughout the country. No journal has done more toward securing prompt and reliable reports in this direction than the American Agriculturist. I have taken the paper for some 20 years and have found its reports generally trustworthy.

President Heiges: My views on this question are in accord with those of the President-elect, Mr. Chase; that the information compiled by the Chairman of the General Fruit Committee should be made public much earlier. Frequently such information would be of value to our horticulturists and fruit growers.

STRAWBERRY CULTURE.

By J. W. ALLISON, *Mercer, Pa.*

From a comparison of the different varieties of fruits consumed, from the amount of capital engaged in growing and the number of people employed in gathering and distributing, there is no fruit grown, unless it is the apple, that compares with the strawberry. Indeed, it grows and is grown for market in a wider range of latitude than even the apple. The markets are supplied with this berry for at least one-half of the year.

Where but a few years ago it was grown by a few growers near the large cities, and who had superior facilities for marketing, it is now grown hundreds of miles from these markets, to which it is sent, not in car lots, but in train loads, and from there distributed to the surrounding towns and villages.

This fruit, which but a few years ago was considered a luxury, and not only looked upon as such, is now considered a necessary article of food, and in its season enters into the daily consumption of all classes. Having thus attained the importance it has, it becomes those who are engaged in its production, to understand how to grow the best fruit most economically.

The first requisite for success is soil in proper condition. This fruit is not particular about the kind of soil, whether sandy or clay. Some varieties love sand, others clay, and some are at home in either. There are four essentials for success, in whatever soil the fruit is grown: The first, is moisture when needed; the second, nitrogen to give growth to vine; the third, phosphoric acid to give quality to fruit; and the fourth, potash to give beauty.

The soil must be such that all surplus water can easily escape, if not by natural channels, then by artificial drains. There must also be plenty of moisture in the soil at all times during the growing season, and more especially during the time of growing and ripening of the fruit. This can be controlled by filling the soil full of humus. Humus can almost always be provided in supplying the second essential, nitrogen. The supply of nitrogen can be best obtained, and in the best form, from stable manure. As stable manure does not contain enough phosphoric acid and potash in proportion to the amount of nitrogen there, the third and fourth essentials, must be gotten from commercial fertilizers containing these elements. A

good formula for land of ordinary fertility is about twenty cords stable manure and one thousand pounds super-phosphate (running fifteen per cent. phosphoric acid and five per cent. potash) per acre. This will give a balanced ration, which we must have in fruit growing. For fear of ravages of white grub, land should be cultivated the year previous to planting in berries, to some hoed crop.

The best success I have had is on ground on which a crop of corn or potatoes had been grown, and sown to crimson clover in July, and this turned under. The clover adds to the humus and nitrogen.

PREPARATION AND PLANTING.

The soil should be plowed deep and harrowed thoroughly. Most varieties are deep rooted, hence the necessity of deep plowing. The harrowing is very important. It should be continued with rolling, if necessary, until the soil is thoroughly pulverized. Plants should always be taken from vines that never bore fruit, and the best plants are obtained from beds that are grown for plants and not for fruit.

These plants, when lifted, should be handled as carefully as plants of the tomato. They have a large leaf surface, and unless protected from the sun and wind, the moisture they contain soon evaporates and they die. When lifted, all dead leaves and runners (and if to be planted immediately and the sun is hot, part of the green leaves) are to be removed. The root should be pruned to about three inches in length, as the plant forms new roots before it resumes growth; and as the new roots are generally within this distance of the crown of the plant, it is better to prune the useless portion.

The best and speediest way I have found to set the plants is to mark the ground with the ordinary corn marker, weighting it so it will mark about three inches in depth. If the ground is in proper condition the weight of the driver will be sufficient. Running by stake, if the driver has a straight eye, your rows will be as straight as a line. Never mark farther than plants are set, so that in planting, the fresh cool soil comes in contact with the roots. In planting, you require a boy to drop and a good careful man to cover, who should get down on his knees, holding the plant in one hand against the side of the mark, and drawing the soil up against it with the other, being careful to get the plant at exactly the right depth. The roots being pruned and the ground being marked to about the same condition, with a little practice this is easily done. Two motions and two handfuls of soil are all that are necessary. A smart man will cover from seven to eight thousand plants in a day.

The time to apply commercial fertilizers is immediately before the setting of the plants, by sowing it along the row. At this time use one-third of the amount you intend to use. The balance should be used about the last of June, sowing it on each side of the row.

This can be best done by going along one side of the row and back on the other. The sowing should be immediately cultivated in, and it is there ready for use by the young plants. The cultivator should be started as soon as plants are set, and kept going until fall.

If grown in matted row, no two plants should be closer than six inches, and the row should not be allowed to get more than eighteen inches in width. When the ground becomes frozen in the winter, apply the mulch. Stable manure, in which plenty of wheat straw is used for bedding, makes the best mulch, though any material that does not lie too closely will do. When spring growth begins, if mulch is too thick for plants to get through, remove part and leave it between the rows.

There are many other points that might be discussed, such as varieties, fertilization of the pistillates, protection from late spring frosts, etc., but time will not permit.

IS IT ADVISABLE TO GROW SMALL FRUITS IN YOUNG ORCHARDS?

By W. B. K. JOHNSON, *Allentown, Pa.*

In reference to growing small fruits in young orchards, I notice there are some exceptions to my experience, whether soil, climatic conditions or the management has anything to do, is not clear to me, and will not endeavor to enter into that part, but leave it for discussion.

About fifteen years ago I set out a pear orchard of some four hundred and fifty trees; in part, I planted the Ferndale raspberry. The first two years the pear trees made an ordinary growth for transplanted trees; the raspberries made a strong growth, coming high into my pear trees and beneficial to the trees. The third year I kept the raspberries lower, consequently spreading more, by forming branches. The tops of the pear trees were free from any shade, making a very satisfactory growth, and the raspberries shaded the stems of the pear tree so that not one was sun scalded on the southwest side of the tree. I had my high water mark the following year with the crop of raspberries, which was, from a little less than three-quarters of an acre, four thousand three hundred and sixty-eight quart boxes. The balance of this orchard was in other crops, to

which we will allude later on. I have grown other small fruits and low hoed crops ever since.

My next was a quince orchard of about six hundred trees; in this I have grown mostly strawberries, potatoes, and once or twice cabbage. I might here state that I grow strawberries in matted rows, thinning them out to allow each plant about three inches space. The last or third year, I let all the runners grow. After the crop is gathered I turn them under; when I think it advisable I sow crimson clover, and when this gets into bloom turn it under. I want all the vegetable matter I possibly can get without souring my soil. When I see it has all it will bear for the time being, I put in potatoes or cabbage with good results, and after this is taken off my soil is in a condition for another planting of strawberries. I cover all my strawberry plants in the fall with stable manure; in the spring rake it off in between the rows. In this manner my ground is frequently worked. The quince roots will not remain on the surface, but striking downwards, making growth of from three to five feet in a season; and as to fruit—well, when men like P. J. Berckman, Ex-president of the American Pomological Association, are astonished to see such large and perfect fruit, wanting some sent to his home in Augusta, Georgia, should be convincing that small fruit is no detriment to a quince orchard, when properly managed.

Since then I set out about twelve hundred apple trees, and about three hundred plum trees. The plum orchard I work very similar to the pear and quince orchard; for my apple orchard I take four-year-old trees; in this I set seedling apples, pears, plums, etc., growing nursery stock. I keep away far enough that the digging will not injure the roots of the young orchard trees. By thus planting I save labor, time and expense, and my orchards receive frequent stirring of the soil, clean culture, with strong, thrifty trees. I believe in taking as much from one acre as I can. I do not believe in working two acres when the same, or better results can be had from one. I do not believe in killing weeds a foot or more in height; but I do believe in stirring the soil that weeds do not get a start. Sometimes, in a wet season, it is difficult to keep weeds down. I find it pays to hire extra help to keep weeds under control, to the benefit of the trees or crop grown.

The question may be asked: "By growing two crops at the same time, it must impoverish the soil?" to which I say, it does not. With me nothing goes on the brush pile to be burned, even the trimmings of nursery stock is put on a big pile and just as soon as it becomes brittle enough to be worked is plowed under. Formerly I used about fifty tons of stable manure to the acre. I use very little now; the crimson clover takes the nitrogen from the air, while phosphoric acid and potash I apply in chemical form. My soil is better and

more capable to stand two crops from one acre, than formerly the one crop; my currants, gooseberries, strawberries, potatoes, cabbage, turnips, and even the red and black raspberries are all in young orchards, with a few varieties of blackberries. I would not advise the thorny varieties of blackberries in a young orchard, for as the wind sways the canes they are very apt to scratch the bark of the young trees.

Experience is a good teacher, though frequently expensive. I paid for it and may pay again; but, in order to learn our soil, experiments are necessary to be made; without it we may never learn what that soil of ours is capable of doing, when and how to assist it, returning more plant food than the previous crop took, never allowing a deficit, but always an abundance of food stored in the soil whereon the plant may feed, by feeding it with good, wholesome rations, changing here a little and there a little. As a spot here or there may be deficient in vegetable matter, or there a hollow where too much nitrogen has been washed and not enough potash or phosphoric acid; or, in other words, familiarize yourself with the soil. We are then apt to make less failures than when we treat promiscuously poor knolls and rich hollows alike; yet the best of us are liable to make mistakes, and generally through a little neglect. For instance, several years ago, I thought my currant patch would not be any the worse to have some crimson clover turned under; so I sowed some. The ground being rich, the clover made a good stand and a good growth; work was pressing me in the fall, and the clover stood all winter. In the spring, work pressed still harder, help scarce, and the clover got in bloom; as it had made a rank growth, it shaded my currants, they making scarcely any new growth. It ruined my crop, and a poor crop the next year; since, it has made up for lost time. Ever since, I am more careful how long crimson clover is left standing in currant and gooseberries. I have seen others as bad off with weeds, and they looked just as mine did—a sickly unprofitable investment. I would as soon expect a good yield of potatoes, cabbage or corn where weeds get the master hand, as to grow a thrifty young orchard in grass, corn or any other crop shading the tops of the trees, or roots covered with a continuous sod.

In passing and repassing to my orchard and nursery grounds daily, I pass a young orchard of about seventy trees, planted about a dozen years ago, in a continuous sod. The soil naturally as good as mine, but my five-year-old orchard trees are as large as those with a much better color. Mine receive good culture and attention, while those do not, and never did since they were planted. This is not the only one I see; but could name a number of such instances. Such men are invariably the ones who say fruit culture does not pay. What a young orchard wants is a frequent stirring of the soil to retain the moisture by breaking the capillary attraction, to let sun-

light and air penetrate the soil. With the foliage fully exposed to the sun and a free circulation of air through its branches, with plenty of food to draw upon, I feel safe to show you a healthy growing tree. In my red raspberry patch I have about two hundred peach trees, and I question if finer and healthier trees are in my county. In the spring I run through them with a one-horse plow, afterwards with the cultivator, let them stand until fruit is gathered, when they are again worked with the cultivator, enough for both peach and raspberries. When trees are getting to have a top ten feet and over in diameter, then they will shade the ground some on the north side. When the branches are kept low, it certainly will show its effects on small fruit, yet in my pear orchard fifteen years old, with branches leading upwards, I can scarcely see any difference in the strawberry yield. In my quince orchard, ten years old, and low, I see it more plainly; but what hoed crop would not be similarly affected, and so long as it continues to pay better than a hoed crop, I expect to continue it; and so long as I find it beneficial to work my orchards, I will try to raise something to pay for the labor, which is a net gain. However, I have the very best reason to believe that neither young nor old orchards should be two or more years in sod, for the roots are sure to strike upwards; then, it matters not how shallow you plow, you cut the feeders of the fruit, and as these roots are cut, in just this proportion your fruit will either drop in dry weather or be undersize. Again, those feeders lying on or near the surface, whether in sod or not, will suffer from an ordinary drought more than if these feeders are kept lower down with a blanket of fine earth on top, when the warmth of the sun and effects of the air penetrating such soil.

I suppose you have all noticed the dropping of fruit in a dry spell in July and August is much more in an uncared orchard than in a well cared for orchard. Did you ever stop to think why? I saw it time and again in an uncultivated orchard. You nearly always find dead limbs, and the living branches and smaller twigs looking black in the morning while the tree is damp. Draw those black, sooty looking twigs through your hand and you will find it black. This covers the pores of the bark and closes them so the tree has to struggle for life. With a poor growth, such trees can at best bring only scabby, imperfect fruit. So long as the fungus is left to cover the vital point of evaporation of the sap part, forming wood, parasites of all sorts are almost sure to follow the weak or sickly, uncared for tree, while the stronger resists the attack. As my time is already overdrawn, I will conclude by saying that so long as my orchards hold the same reputation outside the county as they do now, and my small fruit bringing the best prices in the market, with quick sales, while others have trouble, I see no reason why I should

not continue to grow small fruit in my young orchards. Gentlemen, this is a broad field; I hope the discussion will give us more light than I am able to give in so short a time; let us learn from one another.

Mr. Barnhart: What would Mr. Johnson do with an orchard that has been five years in sod.

Mr. Johnson: I would bring it into cultivation. Try and get a healthy look and growth, and then you can expect some fruit.

Mr. Allison: Cultivation induces wood growth. How do you bring the trees into fruiting?

Mr. Johnson: I first want trees large enough to be able to bear fruit. I want them to make a good wood growth. They will then make fruit spurs and bear fruit.

Mr. Snively: I would break up a five-year-old sod in orchard by using a disc plow or spading harrow. To induce wood or fruit growth, would fertilize as the occasion requires.

The President: I have seen an orchard killed by plowing; all the feeding roots have been cut off. If we plow deep before planting, and set trees the proper depth, there will be no trouble. Constant cultivation will not make excessive wood growth. Nitrogen is the wood-maker. We must have new wood if we want apple trees to bear every year. I have no trees that do not bear every year, but I never allow them to overbear.

SOME POINTS IN DOOR-YARD PLANTING AND DECORATION.

By L. B. PIERCE, *Tullmarie, Ohio.*

There is a popular idea among country people that landscape gardening is not an art for the masses; that its practice and whatever advantage may accrue are only for the wealthy and idle. They also affect to believe that the orchard form of planting in squares, or a helter-skelter way of planting where there is most room, are much superior for a farmer to the skilful planting based upon true artistic principles.

That these common beliefs are all wrong, I think I shall be able to demonstrate in what I shall have to say at this time.

In the first place, the principles— the A, B, C of landscape gardening are no more difficult to acquire or remember than the funda-

mental principles of simple arithmetic. You can enumerate them upon three fingers, or label them A, B, C, if you choose, but before I give them, perhaps it will be well if we understand clearly what landscape gardening means. Most people have associated the term with the expensive and oftentimes hideous grounds of millionaires, have conjured up in their minds an exaggerated meaning which they imagine it takes a bit of dictionary to define. It does not, however, for the art is simply the planning and laying out of grounds, large or small, with a view to the most beautiful effects.

Now, if you will read between the lines, you will see that nothing is said about costly stone walks, rustic summer houses, wooden trellises or wire fences. People associate landscape gardening with masons and bricklayers, and carpenters and blacksmiths, but it is all wrong. How does nature do? You go into northwestern Pennsylvania, where the maple is abundant, and look at a natural landscape late in October, and you see all the colors of the rainbow in vast gorgeous masses which you do not tire of admiring; yet you see no summer houses, no clematis scantily covering a gingerbread trellis; no iron gate posts or carved stone lions. Nature does her landscape work with trees and grass and shrubs, and her nearest approach to anything artificial is the occasional dead stump of a lightning riven oak standing sentinel-like out of an ocean of green. Aniline dyes and mineral paints are desperately cheap in these days, but nature discounts the prices of the druggist a thousandfold. Give her but a rod wide of ground and she will paint your pig-stye and barnyard, and your neighbor's tumble down sheds in twenty shades of green, ranging from the blue of the Colorado spruce at one extreme and the silver gray of the Nordmann fir at the other. To use a slang expression, she can paint "clear out of sight."

She will not do her painting on bits of cardboard and hang them in a row like samples in a paint store, but she will drape them in pendant festoons from the far reaching arms of the Norway spruce, or hang them in graceful beauty on the sprays of hemlock and cypress, to gleam in the bright sunshine, and bow and tremble in the tiniest breeze like the nodding plumes on a maiden's hat. If you live in a mountain region, and sombre evergreens are in such abundance that you are already sated with their beauty, then nature will give you a score of naked forms of equal beauty for your winter pictures, and you need not go out of Pennsylvania woods to get them. The red-twigged dogwood, the green-twigged wahoo, the white-limbed sycamore and birch, the tortuous-branched coffee tree, the grey-barked beech, the red-berried alder, the witch hazel, the pussy willow are samples along this line.

In summer, the material Nature offers you is multiplied tenfold, and much of it grows right on your own hills and in your own valleys.

Some of the lesser forms are the dwarf june berry, the hop tree, the buckeye, the sassafras, the red bud, the pink and the white dogwood, several sorts of spirea, the wild bush honeysuckle, the red wax berry, the wild currant, the trumpet creeper, the woodbine, the bittersweet, the glaucous magnolia, and the native rhododendron. Among herbaceous forms, some are scarce enough and pretty enough, to hunt up and transfer to your grounds. The orange milkweed, the cardinal flower and four varieties of lady slipper, occur to me at this moment as warranting the trouble.

"To gather up these rich native materials and supplement them with the best foreign forms from the nurseries; to arrange them in groups with curving outlines upon the outer borders of a well kept lawn is the sum and substance of landscape gardening." I told you, I think, that a "formula of three postulates would embrace the rules of practice. They are as follows: (A) Preserve open lawn centres; (B) Plant in masses, not isolated. (C) Avoid straight lines."

These are easy rules to commit to memory, but you will find many difficulties in putting them into practice the first time. The first rule seems very easy. Just refrain from planting anything except around the outside. That is easy, indeed. When, however, you go about it, you will suddenly find that you do not know much about trees after all, and that it is much easier to plant an orchard at certain required distances than to plant a narrow border varying in width around your dooryard. The first snag you will run up against is that the trees which you plant along roadsides and somewhat in your yard are not exactly adapted to the new style of planting. If you look around in pastures and along roadsides you will see that maples and oaks and elms only reach their finest development when standing alone, and that they take up a good bit of room.

You will find specimens with horizontal limbs thirty feet long and the drip of such trees will fall upon more than thirteen rods, or one-twelfth of an acre. Of course, you will see that a dooryard of half or three-quarters of an acre cannot tolerate more than two of such trees, and that they cannot be grouped. It would be like grouping spread umbrellas in a show case made for milliners' goods. If you were a Vanderbilt or Rockefeller, with a forty acre lawn, the case would be different, of course, and you could do some magnificent grouping, as is sometimes seen in pastures and along lanes.

The great trouble with the dooryard planting of the past is that the wrong material has been used and it cannot be arranged in accordance with the rules of good taste. People confound shade trees with ornamental trees and always unite the two, as if shade was all there was in desirable planting. In ornamental planting it is true as in other things, that we cannot eat our cake and keep it.

We have got to give over a little ground unreservedly and ungrudgingly to purely ornamental purposes. We can crop an orchard for twenty years and pasture it forever, if grass continues to grow, but we cannot figure on getting anything out of ornamental ground except flowers and beauty, and room for necessary walks. When we get into a frame of mind which recognizes this cardinal principle in ornamental planting, then we can work intelligently.

As we study upon the problems before us, we will find that there are trees other than shade trees, and that some are peculiarly adapted to grouping. These are mostly conifers, commonly called evergreens. For myself, I am very partial to them, perhaps because I have most time in winter to sit in the house and look at and admire them. In Ohio, where evergreens only grow wild to a very limited extent, the conifers give a distinct character to a place which no other planting can give, besides being valuable in sheltering from cold northern and western winds. Their protective powers are wonderful. In the shelter of a magnificent bank of Norway spruce to the northwest of my own home, I can unfold and refold a newspaper with scarcely a rattle of the paper when the wind is blowing a gale of sixty miles an hour on the other side. They seem to give off considerable warmth, for when the thermometer is three or four degrees below freezing point, the snow will melt for 20 feet to the leeward of the group.

There must be something pleasing about the shelter of the trees, for when my neighbors let their poultry out on pleasant winter days they come over and loaf all day on the sunny side of them, although it is thirty rods from their own home where they are fed and have a comfortable house. I have with me photographs of these wind-breaks, which will be handed around presently. I have before hinted that evergreens may be at a discount through a large part of this State because they form so prominent a part of the natural landscape.

Where a man or his family have a prejudice against evergreens, bushy forms of deciduous trees may be used. The purple fringe, the white fringe and the common dogwood may be cut back and made to throw out stems near the ground, assuming bush forms. I have a purple fringe with more than fifty stems, and at a distance in the winter it might pass for a large syringa. The white lilac grows twenty feet high, the purple one twelve or more, while the syringa *grandi-flora* grows sixteen feet in height and eight or ten broad. It is one of our very finest large shrubs, but not generally planted because the flowers are not fragrant. These, with the other syringas, the snowballs, and red willows, or dogwood; the Tartarian honeysuckle, the Japanese quince, the golden spirea and the single and

double deutzias form a magnificent collection wherewith almost impenetrable screens can be planted answering almost as good a purpose in small grounds as conifers.

The two forms of tree or bush-growth conifers and many-stemmed shrubs lie at the very foundation of all landscape work, and you might as well try to have a lawn without grass, as a model artistic place without very free use of these materials. They are beautiful in themselves; they shut out unsightly objects; they separate the ornamental grounds from the fields around them; they form backgrounds for herbaceous and annual flower-beds—in short, they give a character that single-stemmed, trimmed-up trees cannot. They are not only a frame but a part of the beautiful picture you are trying to make about your home.

ABOUT THE ARRANGING.

I have now come to a most difficult part of my work, which is to show, without a stereopticon, the disposition of trees and shrubs in carrying out the rules previously laid down; but perhaps I can give you a simple illustration going to show that the most artistic forms of planting are also the most economical and satisfactory in the long run.

Take a bit of paper and make four rows of four dots each, just as if you were making a plan for an orchard of 16 trees, the dots being in squares. Let these 16 dots represent 16 trees which exactly fill your front yard, the front of the house standing between the two middle trees in the fourth row. Let your dots be one inch apart. Now rub out the four middle dots and place one in each corner half an inch from the corner tree. You will at once see that by the simple re-arrangement of four trees in sixteen, you have made nearly your entire lawn free of trees. Your lawn is open to the sun and rain. It is an unbroken mass of green in summer and an equally uninterrupted plain of snow in winter.

As the sun circles around, the shadows come and go, first on one side and then on the other, a constant change from morning until night in place of the monotonous shadow that clings all day to the common cluttered dooryard. It costs no more to plant the trees in the new way than the old, but you are a constant gainer as the years go by. You can run a lawn mower, a scythe, or even a horse-mower unobstructed; you can see out and passersby can see in; you have changed from the stiff and stilted methods of the orchardist and vegetable gardener to those of nature and the artist. Ever after, if you have used suitable material, the God of Nature will add new beauties to your work year by year until your home has a character peculiarly its own.

Although this is but a crude and rudimentary attempt to plant a

dooryard, you will see that it carries out fully the three rules laid down. 1. By removing the four central groups, we clear the whole centre of the lawn. 2. We make groups of four in each corner. 3. We have a slight curve in the hypotenuse of each triangular group which, if the trees sat upon the ground like fully furnished evergreens, would show a curved edge to the lawn at each group. In short, instead of a square orchard with equi-distant trees, we have an open lawn of irregular octagon form, four of which sides are curved.

Now, when we change these trees from the common type, or trimmed-up form seen in all dooryards—which, as I have before shown, are not adapted to grouping—when we change these to trees that are, we have made a beginning that covers the whole art, and we have but to modify or change the general arrangement to attain any end which presents itself.

Let me suggest some planting in these corner groups which will give you some idea of what may be done, removing the trees which may be supposed to have been set and using other forms. We will take first one of the corners nearest the street, using common well known shrubs.

We will plant in the corner a *syringa grandi-flora*. In front, or toward the lawn we will plant two of the fragrant sorts, one blooming a week later than the other. In another row we will plant four golden syringas, which bloom like the others but have golden leaves all summer. Next we will plant some of the *spirea Van Houtii*, and as we are planting the hypotenuse of a triangle, each row lengthens and we will need about six plants. The two longest rows should be slightly curved. This *spirea* has long, drooping branches which trail to the ground in a fountain-like form, and it makes an admirable plant to connect the lawn with taller shrubbery. Now we have a triangular group of shrubs flowering in May, facing the lawn, with the tallest at the back side so that each has a fair show. They do not occupy ground necessary to the lawn because they cut off a corner; neither do they interfere with the mower. When the shrubs are small the ground should be forked up and kept clean, to insure rapid growth, and this work can be done with less average labor and with no marring of the lawn as if the plants stood singly scattered in the grass. After two or three years the shrubs will need no attention and the lawn mower can be run to the edge of the shrubbery and there will be no clipping with grass hook or house shears around each plant, as in single planting. The group would take thirteen plants, the general nursery price of which is about \$2.00 per dozen.

We will take a corner next the house for our second planting—the one on the side where the cold winds come from. We will plant in the corner a Colorado Blue spruce, then three hemlocks, and in

front five *retinispora aurea*. The latter is, to my notion, the finest small evergreen we have in cultivation. It belongs to the cypress family, is perfectly hardy and wonderfully beautiful either for grouping or as a specimen tree. The new growth is of old gold color and keeps bright from May to October, when it changes from gold to a dark green, retaining this color until growth starts in the spring. At the topiary garden on the Hunnewell place, in Wellesley, Mass., there are huge wedge-shaped sheared masses of this evergreen eight feet high and twenty long, which I have seen twice, and in the August and September sun they gleamed like a fret work of furnished gold. This combination of trees I have in different form on my own grounds. The group as suggested takes nine trees which could be purchased for from three to five dollars, according to size ordered.

Now we will go past the house to the other corner and plant it to entirely what is generally known as red willow, but really is a member of the dogwood family. This shrub, which grows wild in the Central States, has most of its branches cinnamon color and would not be recognized as the beautiful red winter shrub it makes when grown on rich, dry soil, and annually cut back and old wood thinned out. It is a deep crimson when the leaves drop, and grows brighter and brighter until the new leaves start, when it changes to a greyish green. A group makes a most effective and striking winter ornament to a lawn, and in large lawns the effect is enhanced by having beyond it a Norway spruce or other dark green tree.

We have still one corner down by the road to fill, and we will place first, an althea, then each of Tartarian honeysuckle, and golden spirea. Then a row of four or five Japan quince.

This finishes our little lawn for the present, and before we go any farther I wish to call attention to two important points. One is that by the group system we can occasionally add a new shrub or tree to our collection without dissipating our lawn as when we plant something in the middle of the biggest spot of grass we have, as most men and all women invariably do, unless educated to a higher standard. The men have to mow around the various bushes, so they learn wisdom along this line sometimes. In planting the new bush, we may place it most anywhere next the group as little promontories do not injure the outline of the lawn to any extent. Exactly as a lake is made more attractive by bays and projecting points, so a large lawn may be judiciously treated in the same way. In a large lawn not already over planted, one may start new groups with one or two plants at a time, and thus keep up with the times, making quite a unique collection in time. In fact, it is not best to complete the planting of a place all in one season, or in two, as one wants something to do year by year, in the way of new planning and plant-

ing. A finished place is not as interesting to most owners as one to which something may be added and the artistic method of planting in groups give abundant scope in this direction.

The second point I wish to make is, that groups and masses form the very best backgrounds for the display of our finest bedding plants, the bedding plants having more character because of connection with heavier planting behind them. It is upon the same principle which guides an artist in hanging an important picture. He first covers the wall with a suitable background. It is cheaper and easier to arrange beds where but one side is open to critical inspection. A bed entirely surrounded with lawn must have plants of uniform size, and a certain number must be used to complete the concentric rows, but this is not so important where a background is furnished. You can make your bed narrow or wide, as proportion is not such a matter of prime importance as in a bed set in the open. In the planting we have been doing, the row of spireas would not be a good place to bank flowers against, because the trailing branches of the spirea make a finished connection with the lawn which could not be improved by any planting of flowers. On the other hand, the rigid stems of the *Pyrus Japonica* on the other side of the yard, with their glossy green foliage and good height would make an excellent background for a bed of cannas. They would not interfere with either, as the pyrus blooms more than a month before it is time to plant cannas. A double row of peonies could be planted in front of the red group, and with no interference in this case either, for the dogwood is most interesting in winter when the dried peony stalks would have been relegated to the bonfire heap. A bed filled with some of the beautiful coleus our florists are giving us in recent years would do excellently in front of the retinosporas. In fact, they could find no more congenial background than the beautiful soft golden foliage of the retinospora. I might go on for an hour telling you of forms and combinations of beauty which can only be had at their best where the system of planting I am advocating is used.

Perhaps, as you mentally review our little lawn as we have planted it, you will wonder whether I am going to leave this imaginary dooryard without any shade trees. Certainly not. But the number and location of shade trees is a matter that cannot be determined off-hand.

The frontage of the house and size of lot should determine both the number and position. If the dooryard we have been considering is but six rods square and the house faces the south, then one good tree just to the left of the front walk and twenty feet from the steps, and another on the west side near the fence, just below the evergreen group would be enough. As to varieties to plant, that is too big a

question to discuss at this time. In the present case, for the tree down in the yard near the fence, the best one would be a Norway maple. It has a certain strong individuality of character not common to native maples. The tree near the walk might be a cut-leaved birch, a catalpa speciosa, a European linden, or a European horse-chestnut. I will dismiss the shade tree question with a single reference to two trees which have been greatly overlooked. I refer to the Scamston weeping elm and its cogener, the Camperdown elm. As we get them from the nurseries, they are grafted upon rigid stocks eight or ten feet high and fall in fountain form like the Kilmarnock willow. The Scamston will, in a few years, have the top resting with its trailing branches upon the ground, and there are trees where a doorway has been cut in one side of the canopy leading into an arched umbrella-like arbor of great beauty. Both varieties grow a little oblong in form of top. The foliage is much larger than the common elm.

There was a beautiful specimen in the Boston Public Gardens 10 years ago, which I sketched, and the drawing, with quite a number of other sketches of weeping trees, was printed in Vick's Monthly. In shape it was like a large load of hay, the tips of the pendant shoots nearly touching the ground. The largest leaves measured 6x9 inches and the whole growth was luxuriant and pleasing beyond description. The Camperdown has more rigid branches, is quite flat on top, and is an ideal tree to plant in a small yard near the house to hang a hammock under. The only good specimen I know is in Akron, Ohio. The two trees are confused in nurseries and there are not more than three or four places in the country where I should expect to get the kind I ordered true to name.

Now, my friends, perhaps I have occupied all the time I am entitled to and yet have barely touched upon all that might be said upon this topic. I do not want anyone to go home and copy exactly the plan talked about. I have just supposed a square dooryard in front of the house, not because it was the best form, but because it could be easily made to show the A, B, C principles of correct planting. A really artistic dooryard should extend back some ways and be wide enough to show considerable side lawn on at least one side. Then again, the balancing of sides with similar shaped groups is not in the best taste, and is rarely possible except in laying out wholly new places in a clear level field.

The shrubs and trees I used to illustrate the work are old varieties and form a very small part of the material which modern nurseries have gathered in the ornamental line. What I used answered the purpose of showing the planting as to placing of sizes, and also gave hints in regard to adapting planting to the whole of the year,

instead of a few weeks, as much of the planting around country homes is apt to do.

Some important matters, like placing drives and walks, and framing beautiful pictures by proper disposal of close planting, I cannot even hint at. The fact is, my friends, it is a pretty large contract to try to make plain even the rudiments of skilful dooryard planting in a half hour's time. Few realize the slow evolution of the present advanced theory and practice of landscape gardening. I was, during the later years of his life, so fortunate as to enjoy the friendly acquaintance of Adolph Strauch, the landscape architect, who left Springgrove Cemetery, Cincinnati as a monument to his creative genius. One morning he took me into his office and showed me his library which cost for books, engravings and folios more than \$3,000, besides several hundred dollars for the bookcases and cabinets to hold them. This whole library was devoted to landscape gardening, and Mr. Strauch, a German by birth, in addition to the American language, had mastered French and Italian, that he might read what was written in those languages, along the line of his profession. This library was the work of several hundred authors, going back to the beginning of landscape improvement in the sixteenth century.

When you think of this art as commanding such an army of skilled workers, you will, I am sure, forgive me for telling you so little in a brief half hour. It is not a topic to call out flights of fancy, or bursts of oratory, and it was lucky for me that it was not, for I am neither a poet nor an orator. In conclusion, allow me to thank you for your patient listening.

AN ADDRESS.

By S. B. HEIGES, *President.*

I have promised my self to occupy but a short period this evening. During the 37 years that I have been a member of this society, I have spoken a number of times, and can recall no phase of horticulture or pomology upon which I have not expressed myself. However, I have a few practical thoughts which I will try briefly to present.

FAILURE OF APPLES.

We have heard from different sections of the State, of the failure of apples owing to drouth. I can frankly say I fear rain more than drouth. If, by proper cultivation and subsoiling, we conserve the moisture that is in the soil, our orchards and crops will seldom suffer for want of rain. A cistern five feet in depth may be doubled in capacity by increasing its depth to ten feet, and by the same principle we can double the capacity of our soils for conserving moisture. The rains that fall during the spring and summer months are not sufficient. Those that come in the fall and from melting snows in winter are the ones that carry fruits and other crops to perfection. If trees are planted one or two inches deeper than they stood in the nursery row, in properly prepared ground, and then thoroughly cultivated, the feeding roots will remain at the proper depths, and no injury result from after culture. In cultivating orchards we often make the mistake of cultivating too deep. If the soil is kept covered with a dry earth mulch, we cut off the capillary tubes and prevent evaporation. The soil should never, in the summer season especially, be allowed to become hard or baked, and should have shallow culture after every shower. I have observed, time and again, after scraping away one or two inches of dry, loose surface soil, that underneath there would be enough moisture to mature the fruit.

NATURE STUDY.

Another line of thought is the introduction of "nature studies," and the principles of agriculture and horticulture in our public schools. It is my firm conviction that this is the tendency of the modern education. The State of New Jersey has issued a number of bulletins on the subject, and our own Agricultural College has begun the same line of work. I can commend it most heartily, because I know from experience that great interest can be awakened in the minds of the young in this direction. When a teacher, I taught my scholars how to bud and graft; and when Principal of the State Normal School at Shippensburg, I instructed the students to plant and prune, and I found that the girls were quite as expert as the boys.

STUDY OF INSECTS.

Another line of study that opens up a wide and interesting field for the young is the insect world. It is remarkable how readily pupils learn to recognize the various classes and species, whether useful or destructive, and the amount of damage they do. When we realize that \$100,000,000 are lost annually in the United States, and from seven to thirteen millions annually in our own State, we can

form some idea of the importance of this study. But not all insects are our enemies, and we might learn also to know some of our best friends.

BOTANY.

We should also learn something of practical botany. We should know the name and habit of every weed which grows in our gardens and farms. I believe if a census were taken of our farmers, not five per cent. could name the weeds that grow on their own farms. Born and reared upon farms, they know they are weeds and that is all. They don't know whether they are annual, perennial or biennial, and I know instances where by trying to exterminate them they have multiplied them by dividing the roots.

PRICE OF WHEAT.

I have on several occasions, not only before this association, but at Farmers' Institutes, expressed my conviction that the day for dollar wheat has passed, and with it has gone also the opportunity of the United States to control the wheat markets of the world. The price of wheat is now fixed by the "Mark Lane Express," and is governed by the crops of other nations that none become too strong and active competitors. German and English capital have developed the wheat belt of the Argentine Republic, and in one year 23,000,000 bushels have been exported. India and Russia, too, have unlimited resources in this direction, and the completion of a railway from Russia to Port Arthur is not solely for the purpose of maintaining an immense steel clad Russian navy at that point. We are informed also, that at intervals of about ten miles along the line of that railway as it is being built, hamlets are established and students are put in charge of the serfs who are aided and encouraged by the Czar in bringing the millions of fertile acres under cultivation. This outlook surely is not encouraging to the American farmer who pins his faith to wheat as a money crop.

This should admonish our farmers and horticulturists to turn their attention to fruit. In no branch of agriculture would they have less competition. There is demand in England for our best apples. Nowhere in Europe can they be grown as easily and successfully as here. Is it not evident, then, that our boys should study these questions? The bulk of the practical business transacted in Carnegie's office at Homestead, is embraced in the four fundamental rules of arithmetic, fractions, percentage and discounts. Much of the time devoted to geography, reading, etc., might be more usefully employed in nature studies. If these remarks shall lead to further discussion of this important subject, the time will not be spent in vain. I thank you for your kind attention.

ADVANCEMENT OF FLORICULTURE IN ALLEGHENY COUNTY THE PAST FORTY YEARS.

By P. S. RANDOLPH, *Pittsburg, Pa.*

Floriculture has advanced very rapidly and has become a very important industry since I entered the business forty years ago. The houses were usually built 30 to 75 feet long, each heated by flues or separate boilers. Watering was done with the ordinary watering can, and much valuable space was lost in order to make room for the cumbersome step-ladder which was necessary, not only in the watering, but in all the details of greenhouse work. Yet there were doubtless as fine plants grown then as now, though not without greater expense. At that time there were but two florists in Allegheny county, except several that were connected with nurseries in operation here.

Three or four years after I began business, Peter Henderson introduced his system of heating with hot water. This effected quite a saving in labor and fuel, as one fire would answer for five or six houses. About this time began the demand for bedding plants and, in consequence, the trade increased rapidly. The trade in cut flowers then was rather crude. The *Camelia Japonica* was the leading flower then, and a florist's wealth was estimated by the number of camelias he had. Blooms that were extra fine brought \$1.50 to \$5.00 each, and flowers usually averaged 50 cents each, that would not now bring five cents apiece, as they are not desirable for cut flowers, owing to their lack of fragrance and absence of stem. Centre pieces were made with wet sand. Bowdrias were also popular then, and Carnations were rapidly coming into favor also. Roses usually were not to be had until about March 1. Boston florists grew fine tea roses, such as "Bon Silene," and "Safrano," varieties that are seldom seen now.

I want to say of Peter Henderson, that he was the best florist I ever knew, and freely gave information for the benefit of others, although in the same business. His book, entitled "Gardening for Profit," was a mine of information on that subject. During recent years the Society of American Florists came into existence. A trade paper has also been established, which is of great value to enterprising florists. The society meets annually in some leading city, and our brightest men give their experience and are glad to tell what

they know. I can well remember when we had but two or three varieties of Zonale Geraniums. The General Grant was introduced, and although it had small flowers, it had an exceedingly large truss, a brilliant scarlet, and there is not a better bedding geranium to-day. Holland and French bulbs were comparatively rare, or at least not used largely for bedding as now. Planted in October and November, they make a brilliant display in early spring.

When I came here in 1864, the florist business was, in a measure, in its infancy, and oftentimes the outlook not very bright. Some of the duties are not always pleasant and agreeable, but to one who has his heart in the work, it is entertaining, and no one need be ashamed to follow it. We cannot, perhaps, expect to get wealthy, but can make a comfortable living.

PENNSYLVANIA AS A FRUIT-GROWING STATE.

By PROF. JOHN HAMILTON, *Secretary of Agriculture.*

Before taking up the subject upon which I expect to speak, I want to commend the views, in regard to education, advanced by your President in his address this evening. I believe we must improve agriculture by beginning with the rising generation—the children—inculcating in their minds a love for nature and nature study.

In arranging for our Farmers' Institutes last fall, this idea of nature study in our common schools was made a special feature of our institute work. The results thus far have been most gratifying. The audiences have been enthusiastic in their approval and are inquiring why a movement in this direction was not begun years ago. We need nature study in our public schools, and we will have it before many years. You all are familiar with the changes that have been effected in our leading colleges in teaching the natural sciences. Within twenty years the same revolution will take place in our common schools.

In order that our teachers can have literature to which they can refer, the Department of Agriculture is now in correspondence with more than 200 leading educators in the United States and Canada, with the view of securing a list of the best standard works on the natural sciences adapted for use as a library in our public schools. We hope in this way to secure advice from the most capable instructors in this country on this important subject. But this is preliminary to what I want to say.

I was very anxious to come to this meeting. I wanted to meet and talk with the men who have stood by this society up to the present time. Your organization has done and is still doing good work, and should be encouraged. It has done much to develop the horticultural interests of this State and much yet remains for it to do. Years ago, the hills in Juniata county were a synonym for poverty. The lowlands and meadows only were deemed worthy the attention of the farmer and fruit grower, until a shoemaker, a graduate of David Miller's fruit farm in Cumberland county, planted a peach orchard there and became the pioneer of a great and profitable horticultural industry. I am informed that in one year there came into the Mifflin banks \$100,000 for peaches alone. This is one of the practical results that has followed the teachings of this society. Yours is not a selfish organization, but your experiences, your successes and failures are given freely to all who may care to profit by them. Surely this organization will not entertain the thought of abandoning its work now.

Excepting California, this is probably the best State in the Union for fruit growing, and even California does not grow as good fruit as Pennsylvania. I think it can be proven by abundant testimony, that for flavor, our fruit, especially apples and peaches, stands at the head of the list. New York apples cannot compare with ours in richness and delicacy of flavor. So with plums, pears, cherries and berries of all kinds. Our fruits compare favorably with those grown anywhere in the country.

In one very important particular we have much to learn in this State, and that is how to handle and properly prepare and ship our fruit to market. We can learn much from California in this direction, and can easily see why fruit that is inferior in quality will often command a much better price and sell more readily than that of better quality that is carelessly handled and packed, and even more carelessly displayed in our markets and on our fruit stands. It is surprising how handsomely a little care in this direction pays, and how small a figure quality really cuts in the sale of fruit. People want things to look well; be attractive to the eye. Our tastes in that direction have greatly improved, and some of our growers don't seem to know how much appearance has to do with helping to sell. The masses among our fruit growers have not yet waked up to this important point. In New England there is much more care and taste displayed in this direction. Their fruit is carefully picked and assorted. Apples are put into first, second and third grades, and their second grade is sold in our markets at better prices than our average grower gets for his best. There is with us great room for improvement; room for increased crops, and need for greater care in the preparation of our fruit for market. Fruit from this

State should be known as Pennsylvania fruit, and as such, if properly handled, it will command the highest price. We need also to impress upon our people the fact that the highest grades of fruit never go begging. We ought, as a society, to send to our farmers and fruit growers information showing them how to grade their products to best advantage. Much that is offered for sale should never get into our markets at all, and no fruit should be considered strictly first class unless entirely free from scab, knot, worm-holes or blemishes of any kind.

Now, a few words as to what the Department of Agriculture of Pennsylvania has done and wants to do for horticulture in this State. You know, there are a number of Divisions in the Department, but no Horticultural Division. There is no place where the interests of horticulture have special attention, except in the State Horticultural Association. Lately, the Department of Agriculture has taken up the matter of horticulture and market gardening, through the Division of Economic Zoology. For the present, and until the interests of horticulture have further aid and recognition from the State, that Division must look after this work. Some preliminary work has already been done. Postmasters in Pennsylvania have been written to, and over 30,000 names of persons interested or engaged in horticulture and fruit growing in this State have been secured. Many of these are amateurs and are not engaged in fruit growing for commercial purposes, but from this list there have been selected about 1,000 names of the best fruit growers in the State, and with their aid we hope to collect and publish information that will be of great value to the horticultural interests of the Commonwealth. We have no appropriation, but will do the best we can until we are able to get together and see what we can get from the Legislature to foster this industry.

We need a law to regulate the sale of nursery trees and prevent unscrupulous nurserymen from selling infested or diseased nursery stock in the State, and that will protect other States from receiving diseased nursery stock from us. We need a law, also, that will regulate and determine the size and capacity of fruit packages. When we buy a box, a basket or a barrel of fruit, we want definite information as to how much we are receiving. New York now has such a law and has a fixed standard for fruit packages.

There is one thing more of which I wish to speak and in which we are interested. We want to encourage the canning industry in this State. I never fully realized the magnitude or possibilities of this industry until I visited some canning establishments in Geneva, New York, last year. I want to read you some figures showing what it means to that vicinity. For one factory farmers raised in one season 575 acres sweet corn, 375 acres peas, 125 acres string

beans, 50 acres lima beans, 350 acres squashes, 75 acres pumpkins, 75 acres asparagus, 12 acres rhubarb. Another establishment canned 35,000 bushels apples, 7,000 bushels pears, 10,000 bushels plums; peaches, they could not give me the amount; 1,500 bushels quinces, 300,000 quarts raspberries, 50,000 quarts blackberries, 50 tons cherries, and large quantities of currants and gooseberries. You can imagine what a market this gives for home products, and what benefits it brings a community.

In conclusion, I want to say again, that I am glad to meet with the fruit growers of Pennsylvania, and to say to you that the Department of Agriculture is willing and anxious to help to strengthen your hands and assist in making your organization more than ever a power for good to the horticultural interests of the State.

ORNAMENTAL HORTICULTURE.

By WM. H. MOON, *Morrisville, Pa.*

The topic assigned me is one of unbounded magnitude and interest to the true lover of horticulture and may include in its scope the small plot surrounding the home of the humblest peasant, the prosperous day laborer, the gentleman in medium circumstances, or the multi-millionaire. Any or all of these may be either possessed of or devoid of horticultural ornamentation.

It is not the size of one's possessions surrounding his domicile that necessarily determines its attractiveness. But the evidence of that taste and study of tree, vines and shrubs and the love and care of them which produces the best results that suggest to the passerby the beauty and charms of a well kept home grounds. It is well that there are many individual tastes and opinions all with one common object. It is this diversity that makes ornamental horticulture such an interesting study for the student of nature and prevents the effect of sameness.

The study of ornamental horticulture is one of never ending research. The study of adaptability to every detail in location, elevation, situation, outlook, present effect, future results, hardiness, habits, growth, town foliage, flower and fruit. These topics all require the greatest familiarity to produce the best results. The idea that none but the very wealthy can be possessors of ornamental grounds

around their dwellings is a fallacy. The most unique effect is often found where the owner, having a taste and fondness for rural pursuits, devotes a portion of his own time to the adornment of his grounds, acquainting himself with every new acquisition, studying its growth, admiring its characteristics and forming an attachment for these silent neighbors which prove beneficial in diverting the mind from the rush and turmoil of a busy world to the more quiet and restful one of a rural home. Contrast with this the millionaire quoted by a recent English author, who said that "of all the bills he had to pay, he begrudged most the expenses connected with that confounded garden."

By the adjective describing the esteem in which this portion of his possessions were held, what could be expected from such a land owner? What encouragement to employes to produce the best results? When they know their efforts are not appreciated and that the pittance paid is given grudgingly. Did it ever occur to you the great number of persons owning country places, either those to be ornamented in a horticultural way, or those already planted and improved, who have little or no taste or interest in horticulture; who do not know a shrub from a tree, a deciduous from an evergreen, a huckleberry bush from a hollyhock. There are thousands of such land owners who want their grounds ornamented because it is popular to have them so. On one topic most of them have an opinion; they want shade. They want it at once. They want the growth of 20 years or more transplanted to them and set down so that there will be no interruption in growth or withering of foliage.

Many of these look upon horticultural topics as effeminate and beneath their consideration. One of the minor matters only worthy of the direction of their wife and daughters. Consequently, when they learn the estimated cost of proper horticultural ornamentation of their grounds they are surprised at the expense. The rule established in England, we believe, is ten per cent. of the cost of the house to be set aside for planting the grounds. We presume this rule is liable to great variation, according to the size of the tract. A gentleman may talk very knowingly to his coachman and groom regarding his stable and its inmates, he may direct about his kennel, he may seem very intelligent and up to date when discussing about his yacht, but when he comes to dictate to his gardener, he is all at sea. He cannot appreciate his best efforts; he does not see the beauty of his latest acquisitions, but measures his value and ability by his early vegetables, sweet corn or green peas, or his choice strawberries or grapes.

ORNAMENTATION OF AVENUES.

The planting of avenues with ornamental trees affords an opportunity for diversified taste and effects. Whether the wants of a speculative land company who desire to mark out streets by planting trees, and are anxious to obtain the cheapest and quickest results, regardless of quality are to be met, with such varieties as silver leaved maple and Carolina poplar; or whether more enduring and graceful effects are sought after in the selection of the Norway or sugar maple or other trees of this character, we cannot but admit that each has its place; each are useful in their way. The newer introduction from the Orient will very probably some day divide honors with the aforementioned sorts. For surely the Oriental Plane tree or European buttonwood combines characteristics of rapid growth with compact dense form of habit, large foliage, and longevity to a degree that make its increased demand self evident. We believe the better this variety becomes known the more generally will it be planted.

The effect of avenues planted with cut-leaved birch, where location and climate are suitable, is very striking and worthy of imitation where novelty is more desirable than dense shade. The Salisburia Japan Guigko, or Maiden Hair tree, may be classed among the comparatively odd or grotesque avenue trees which is being increasingly sought after, as differing materially from the old standbys, such as elms, maples or poplars. The oddity of its growth, the irregularity of its branches and the peculiar shape of its leaves all have a relieving effect. Of all the choice avenue trees where time is not the sole object sought after in obtaining results, where the soil is not contaminated with city gas, coal ashes, cinders or other evidence of advanced civilization injurious to tree growth, and where the air is equally free from poisons, for such a choice location, we know of nothing handsomer than the oak, either the Pin, Red, or Scarlet oak. The symmetrical habit, the beauty of summer and autumn foliage, their longevity and general appearance characterize the oaks as a class of trees that have few equals and no superiors.

LAWN ORNAMENTATION.

Having thus discussed avenue ornamentation, we will turn to the lawn and grounds surrounding a dwelling where formerly the planting of a few straight rows of trees at right angles was considered all that was necessary to supply shade, whilst the occasional intermingling of a few large growing evergreens and an occasional flowering shrub planted singly completed the requisites for a finished lawn. Contrast this with the advancement of to-day, when the shade is provided by the selection of some handsome growing decidu-

ous trees of cleanly habits, sufficiently diversified in variety to avoid sameness and sufficiently dissimilar in foliage to furnish contrast, the size of the lawn and character of buildings, the outlook and elevation will suggest the number of trees required. The beechs, American, European and Purple-Leaved, the American white ash, lindens, American, European Silver-leaved Norway, Sugar and Sycamore maple, Oriental buttonwood and oaks in variety, including Red, Scarlet, Pin and White oaks, are all desirable and specially adapted for such planting, while an occasional chestnut or walnut suggests not old shade but other pleasure as time advances.

The shade of a lawn having been provided, the balance of the planting is ornamentation and should include as great an assortment of evergreen and shrub effects as space will permit without overcrowding. The selection of choice evergreens for a lawn is a pleasure to the admirer of this class of trees. The diversity in character, form, habit, growth, and foliage is charming, and the choice of specimens adapted to each nook in the lawn is a study enjoyed by the true lover of horticulture. The stately *Picea* and *Abies* families, including the Norways, European and Nordmann's Silver fir and that beautiful Glaucous foliage acquisition of the Rockies, the Colorado Blue spruce and their various allied relatives, together with numerous varieties of pines, offer a choice combine from which to obtain trees of medium to large growth, which can be planted singly as specimens, or interspersed with the deciduous trees already selected. The smaller growing evergreens include the dwarf arborvitaes, hemlocks, dwarf spruce, junipers and the large family of *Retinosporas*, with their striking and varied colored foliage. All these provide rare novelties for planting singly, in groups or on borders in connection with shrubs, grasses, etc.

The evergreen effect is charming, whether viewed in all the various shades of a luxuriant spring growth, later when they have attained their autumn maturity, or in the winter when covered with the newly fallen snow. No planting is complete that does not include a goodly number of flowering shrubs and climbing vines. The former, when wisely selected and judiciously arranged, can be made to present an attractive feature of the lawn the entire season. Bloom alone is not the only recommendation to many shrubs. The variety and contrast in color of foliage is very striking and adds to the bloom effect.

The names of the desirable acquisitions in this class may be said to be legion and too numerous to mention here.

The vines must not be forgotten. Where an old stump or other desirable location can be found, they should be used freely, as well as around the porches and trellises. The sloping banks may be prevented by washing and made to blossom as a rose by planting the

Rosa Wichuriana, the *Vimca Menir* or some of the rapid growing honeysuckles. When possible, aquatic effects should be introduced and those attractive water lilies of different shades, and the other aquatic novelties added.

Thus far and no allusion to hedge planting without which a planting would hardly be complete. The old-fashioned thorn hedge, with its irregular openings and evidences of neglect has been supplanted by the more modern California Priest, of all the deciduous hedge plants we believe the most desirable. Its popularity is gaining and its ease of growth and culture place it beyond its rivals. The choicest evergreens for hedges are the Norway and Hemlock spruce and the American arborvitae; each have their advantages, which location and object sought after alone can determine. Another feature of horticultural interest now rapidly on the increase is the establishment of parks in all large cities and in many not so designated. This shows a commendable interest in the cause and is a feature to be approved of from an educational and charitable standpoint as well.

When we recall the fact that the first park in England was established during the reign of Henry the First, early in the sixteenth century, and was surrounded by a wall, we cannot but admire the advance of civilization, which makes the parks of to-day the centre of horticultural adornment, either native growth or acquired, the drive of the wealthy, the recreation ground of the toiler and the play ground of the poor; the breathing spot for all who long for the fresh air of the country and the shade of the forest. The reputation of a city's parks are among its plaudits. Many of us who have never before had the pleasure of visiting your city have heard of the beauty and attractiveness of your Schenley, Highland and Allegheny parks, and as time advances and means become available, there is no question but what their value and availability will be greatly advanced under the present efficient and competent management. What is true of Pittsburg is equally so of other cities throughout this broad land. With increasing prosperity ornamental horticulture should meet with a new impetus, and in the next decade make more rapid strides than in the past.

Mr. Pierce: What is the best handbook or catalogue on this subject?

Mr. Moon: I do not think of anything up to date. The best source of information is the various catalogues.

Mr. Pierce: I was much interested in the paper just read, although I cannot agree with the author in all points. While the elm is one of the finest trees, I do object to Japan Guigko. It is a deciduous tree, with the habit and appearance of a conifer. To me it is one of the most disagreeable and inartistic trees we have. Like the Canada thistle, the more you have the worse you are off. I saw in Fre-

donia, N. Y., some Cut-leaf Weeping birch that were the finest trees of this kind I ever saw. They were about 50 years old and not yet in the height of their beauty. As to the oak, it is one of the handsomest of trees, but there is some objection to it as a lawn tree owing to the fact that it drops its foliage all winter and is in consequence a source of trouble to the lawn mower. Sweet gum is even more beautiful than the maples, and is hardy within 30 miles of Lake Erie.

Mr. Moon: I agree with Mr. Pierce as to the magnificence of the elm as an avenue tree. It cannot be surpassed where it succeeds, but it does not thrive everywhere as in New England. As to the Sweet gum, I have known it from boyhood but have never known it to sucker, as stated by Mr. Pierce. It is as common as any native tree, and one of our finest trees in Eastern Pennsylvania. I have sold it for cemetery planting, but it is objectionable for that purpose because the gum and moisture which drop from the foliage will discolor the stones.

Mr. Pierce: From my observation, I was under the impression that the sweet gum suckers—what I took for suckers—may have been seedlings.

THE PACKING AND SHIPPING OF FRUIT FROM A COMMISSION MERCHANT'S STANDPOINT.

By THOMAS RENTON, *Castle Shannon, Pa.*

This subject can be best considered by starting right from the ground. The grower must learn by experiment and by conferring with his brother horticulturist, what varieties will suit his soil, and the condition under which he intends to market his crop; and on this point it would appear that great benefit can be derived from such associations as your honorable body, and that you should have the active and earnest co-operation of intelligent and progressive growers. The classification and grading of all lines of produce, is getting to be of more importance every year, and the grower who attempts to grow and handle fruit as it was done a generation ago, cannot expect any greater success than is secured in any other business by old fashioned and out-of-date methods. If the grower is close to a home market to which he can haul his produce and handle it himself, he will soon learn what varieties and what packages best

suit his needs. But if, by reason of his location, he is compelled to seek distant markets, then the question of what varieties he shall grow, and what package he shall use becomes of the greatest importance. As an example, take strawberries. You know some handsome, luscious varieties which are excellent for the grower who can haul them to market and sell them within a few hours, but which are so soft and tender that they would be worse than useless to the one who is supplying distant points. What is necessary in the latter case is something that is hard and firm enough to stand transportation and present an attractive appearance when it reaches its destination.

Everything should be carefully sorted, and in most cases it will pay to make two grades, which should be plainly marked on the packages. Then they should be faced or topped out with some of the brightest so as to show up handsome and attractive when opened for sale. Use new, clean packages only, as a slovenly, dirty vessel will spoil the appearance of the finest goods, and it is poor economy to use them under any circumstances. If for no other reason, returnable packages should be avoided, as they get weather stained and dingy, and discredit your shipment at first sight. The gift crate has many points of advantage. You estimate your crop and buy crates enough to carry it, and avoid the unpleasant and unprofitable experience of going to the station for returned crates which have not arrived, while your fruit is ripening at home and nothing to ship in. If you always have a new crate your fruit will show at its best, and the cost is not much, if any greater when you take into consideration the baskets and divisions which are largely missing and the proportion of crates which are sure to be lost every season.

It would take too long to go over the different packages used for various articles and the methods of packing in each case, and no doubt this matter is more or less familiar to all present to-day, but this principle should always be borne in mind, that any packages, of whatever size or shape, used for shipping fruit or vegetables, should be perfectly stiff and rigid. Any package which sags or gives in any way, will cause the contents to become bruised in the handling *enroute*, and either lessen their value or cause total loss. I have an unpleasant recollection of receiving a consignment of plums in slatted crates, where only one nail had been driven in the end of each slat. The crates changed their shape every time they were lifted, and the contents had gone to pulp and seeds by the time they reached us.

Before leaving the subject of packages, allow me to say a word in regard to the disposition shown in the past few years to use scant or short measures. The slang name here is "dinks." All will admit that the "dink" was "conceived in sin and brought forth in iniquity."

This abuse has grown to such proportions that the State of New York has passed an act regulating packages, with which I am not familiar enough to criticize it, but it is certainly true, that legislation along the same line is badly needed in Pennsylvania, and I have no doubt that your association could exert a great influence in this direction. Possibly the best course would be to compel makers to brand the capacity on each package, and allow the people to use any size they prefer, and an act of Congress which would apply to all the States would be best, as it will avoid complications which will arise from different acts in the various States. All the large cities receive consignments from many different States, and a package which fulfilled the legal requirements at point of shipment, might cause a violation of law at place of sale, and this can only be avoided by national legislation. If your association will give attention to to this matter, it will have great weight in effecting the much needed action.

And now a word in regard to the matter of shipping your products to the best advantage. The most perishable will have to be shipped by express, and should be put on such trains as will insure their arrival on the market as early as possible, as the best trade is always during the early morning hours. Refrigerator cars work very well during the early months, and southern produce is successfully handled in that way, for the reason that it is taken out of the cars into a comparatively low temperature; but during our hot weather, goods which have been in cold cars, decay very rapidly when exposed to the air, so that for this latitude, the express service seems to be the best that can be obtained.

BEST MEANS OF SELLING FARM PRODUCTS.

And now we come to consider the best means of selling farm products to obtain the best possible results.

The grower cannot afford the time nor expense of making a trip with each shipment. He is needed at home to attend to the gathering and packing of his crop; must see that everything is properly graded and put up in good shape for shipment. And then he cannot keep posted on prices unless he is in constant touch with the market. Fluctuations are sometimes very rapid (especially in the most perishable articles), and it requires experience, knowledge and constant attention to be able to handle them intelligently. It is just here that the necessity for the commission man comes in. I know that we hear and read a great deal about bringing the producer and consumer together, but I have never seen nor heard of any practical scheme to eliminate the middle man in the problem of disposing of perishable produce. On the scale on which business is done to-day, one man can't do everything. You must employ one to plow, an-

other to reap and another to sell the product. If the farmer is reasonably careful in selecting the house to whom he makes his shipments, and will ship regularly to that house, I believe he will secure the best returns for his goods. Nothing is gained by dividing shipments amongst several houses, and thus putting your own goods into competition, besides cutting your shipments so small that they have little value to the receiver. And the practice of changing frequently and shipping to those who quote the highest prices, is the cause of much of the dissatisfaction which we hear from shippers. Any house which throws out the bait of extravagant quotations is doubtful, and when you get price lists from strangers quoting above those of reliable houses, or offering to handle goods for less than the regular rates of commission, or make no charge for hauling, etc., it is evident that careful inquiry should be made in regard to such houses before consigning anything to them. The commission business is not a benevolent enterprise, and the expenses have to come out of it somewhere. One great item of expense that has been added in recent years is the local soliciting. In the beginning, some houses which could not secure business in the ordinary way, put men into the different fields to secure shipments. The sharp competition which resulted, has compelled many who are opposed to the plan, to do likewise or lose the business. If you will figure the wages and other expenses of the solicitor and set it off against the legitimate commission on the shipments he secures, you will see that the solicitor is an institution that should be abolished. His one object is to get shipments in order to hold his job, and many of them will misrepresent the market, libel their neighbors, or resort to any means to accomplish their purposes.

It would be well if growers could make more frequent visits to the markets to which they ship their goods; especially during the shipping season. They can get an idea of the condition in which their goods arrive, and also of the changing conditions which affect prices. There are many causes—the good prices of to-day may attract increased shipments and cause an overstock to-morrow; a wet day may keep many buyers at home, and thus decrease the demand; the delay of an hour or two in the arrival of the express train, and the condition of the atmosphere during time of transit may cause the goods which were apparently in good shape when shipped to arrive in poor order. These are only some of the causes which may disaffect prices and give the shipper the impression that he has been unfairly dealt with, and he should be very sure of his case before he makes accusations of untruthfulness and dishonesty.

The commission man who expects to continue in business is compelled to use his best efforts in the interest of his patrons as a mere matter of good business policy, for without he can count on a large

number of regular shipments, he cannot successfully conduct his business. It seems to me that the interest of each is so much the interest of the other, that what we need to do is to get into closer and more intimate relations with each other and work earnestly and intelligently for the good of all.

Mr. Altfather: New packages always give better results than old ones. It is also best to send full packages but not larger than standard size.

Mr. Moon: In New Jersey 16 quarts is considered a standard basket, and must be so branded. In Maryland 18 quarts is said to be the standard size. The question is whether it would not be best to sell all produce by the pound.

SOME POINTS IN POTATO CULTURE.

By ALVA AGEE, *Cheshire, Ohio.*

An abundance of decayed organic matter in the soil favors the growth of the potato plant and the development of the tubers. It keeps the soil loose, furnishes plant food, and holds moisture.

If the use of nitrogen, phosphoric acid and potash in commercial fertilizers is necessary for largest profit, it is well to take half the nitrogen from nitrate of soda and the remaining half from a slower form, such as dried blood. The phosphoric acid can be gotten cheaply from high-grade acidulated rock. I do not fear the potash in the form of muriate if it is broad-casted before planting, so that rains may wash out the chlorine matter. So far as my experience goes, the quality of the tuber is not adversely affected by the muriate when this precaution is used.

"Seconds," or potatoes too small for market, may be good seed. If they are setts of vigorous vines, and are small because they did not have time to become large, they have the required vitality; but if they are setts of weak vines, and are small because the parent stalks were weak, they do not have the needed vitality. I prefer to err on the side of safety by using large potatoes—tubers of medium size—for planting, cutting to pieces of two eyes each, and planting single pieces fifteen to eighteen inches apart in rows thirty-two to thirty-six inches apart.

Potatoes should be planted deep, and the strongest buds are made when the first growth is made in or near the light and air. That

means a deep furrow and very light covering. I have learned to discard the covering disks of planters, and the seed is left in the bottom of the furrow, having as a covering the small amount of fine soil that rolls upon it from the sides of the furrow as the planter shoe passes. This method gives a strong, heavy sprout. As soon as it appears, a harrow or weeder is used on the ground, thus partially filling the furrows. When the potato plants appear through this, a second harrowing fills the furrows, giving loose, clean soil for the potatoes.

The potato scab is a fungous disease that may be in the soil. If it is on the seed to be planted, the germs are killed by use of a solution of corrosive sublimate, but when it is in the soil, the problem is more difficult. After four or five years experimentation, I am firmly convinced that a slight souring of the soil, by plowing down a green crop in the spring, furnishes conditions under which the scab germ can not thrive. During these years I have used rye for this purpose, plowing the growth under when about twelve inches high, and have cleaned some very foul land of this disease.

The prevention of early blight in a way practicable to an extensive potato grower puzzles me. I apply the Bordeaux mixture with an arsenite until vines fill the middle in our early planted fields, using a barrel and pump on a one-horse wagon, with a spraying attachment to the wagon that covers four rows at a time. This spraying kills or drives away the flea beetle, whose work probably induces attacks of early blight, and it may prevent attacks of other insect and fungous foes of the potato, thus aiding the best possible growth before the customary time for appearance of the blight. That time is in midsummer, when some very hot and showery weather usually prevails for at least a few days. In such weather I have, as yet, very little faith in preventives of early blight. If money were no object and the vines were kept thoroughly coated with the Bordeaux mixture throughout the growing season, using knapsack sprayers for this purpose and making applications after every rain, the blight might be controlled. I do not know.

The late blight is not a prevalent disease of the potato in Pennsylvania, appearing only in quite cool and moist summers.

Methods of cultivation of the potato depend upon the character and condition of the soil. When it is loose and properly drained, level and surface cultivation is decidedly best. For ease and cheapness in handling the crop, light and substantial bushel boxes are almost a necessity.

SELECTION OF VARIETIES; HOW TO PLANT, PICK AND STORE THE APPLE.

By W. R. BARNHART, *Greensburg, Pa.*

The American tourist abroad, in looking with admiration out over the fine, large well cultivated farms of England, the rich valleys, hillsides and vineyards of France, the thousands of fertile acres, in a great state of cultivation, in Germany, the garden spot of the world for delicious fruits in sunny Italy; all producing most wonderful crops of the cereals, vegetables and fruits adapted to their soil and climate, and for the preservation of the human family, he will at twilight in the eventide, when in conversation with the people of different nations, look over homeward and exclaim! "My own dear America," with your Republican form of government, with your inexhaustible mineral wealth, with your vast area of broad acres and variety of soil and climate, so well adapted and sufficient to feed the world of almost all kinds of the best cereals, vegetables and fruits of the age, you are to me the dearest spot on this universe. America, with all your fine fruits of different kinds, both large and small, there is nothing to compare with or to take the place of the apple.

The apple stands out over and above every other fruit. It is the fruit for the masses; it is the fruit for all; it is the fruit for the most part of the year. While some of the States produce more, larger and finer looking apples, our own great State of Pennsylvania produces the finest flavored apples of this country. In 1876, at the Philadelphia Exposition, after a careful examination of the apples from the different States, I came to the conclusion that California and Oregon were the only States that had finer specimens of the good old reliable varieties, than I had taken from my orchards at the time for our county fair. I did not then know that they lacked in flavor. I had at that time more than thirty different varieties in my orchards. I wanted to learn something of the different varieties for my own benefit and the benefit of others. I am willing to give my experience and mistakes in selecting varieties, in planting too close, in filling in my apple house with sawdust, for the general good. We hear people talk about the mistakes of Moses, and of late of the mistake made thoughtlessly by Admiral Dewey;—why concern ourselves so much about the mistakes of others, that will

do us no good, when considering our own might benefit ourselves and fellowmen. It is a mistake to have too many varieties of apples in an orchard for home use or market. We want to have a selection of high grade varieties that will suit our locality and market. We don't want a low grade, mean, flat apple for home use or for market, when we can just as well have good apples.

SELECTION OF VARIETIES.

I will not have time in this paper to tell of my mistakes in selecting varieties. I will give you a list of the varieties, and the number of each, that I would plant now, after some thirty years experience, and this list will be different in a few cases from what it would have been ten years ago. Taking 100 trees for a basis, we will say Early Harvest, Red Astrakhan and Early Strawberry or Summer Queen, each two trees, making six for summer apples; Maiden Blush eight, Fall Pippin two trees, making ten for autumn apples; Baldwin thirty, Northern Spy, Winter Maiden Blush and Rambo each ten, Roxbury Russet, Newtown Pippin, White Pippin, Greening, Smokehouse and York Imperial each two. If you can get the Bosler, Grimes Golden and King grafted up, we will say four of each; otherwise they will not last to pay for planting and we will then add to the Northern Spy and Winter Maiden Blush each five, and to the Rambo two, making the 100 with 84 winter apples. This selection of summer and autumn are all fine sauce and cooking apples; the Maiden Blush is the best bearer and sauce apple in the orchard.

The Baldwin is still at the head of the list as a grower, bearer, keeper and for home use or market. It is uniform in size, high color and you pick more from the tree than almost any other. It has more good qualities than any other, not as fine flavored as the Northern Spy, yet a good, high grade apple. We never get too many Baldwins. The Belleflower is rich, only too rare an apple. We have given it up entirely. The Northern Spy is the finest flavored apple we have from mid-winter until spring; the tree is a good grower and hardy, and fairly good bearer. The apples rot much the first few months in the fall. The Winter Maiden Blush I don't have; yet from what I know about it, I think it would be one of the four best winter varieties for home use or market. The Rambo has not been doing well for some six or eight years, until this year it appeared to come back to its old place, as the apple above every other apple as an eating apple in its season from fall to February; the tree is a strong grower, inclined to height, and a great bearer. To my mind the Rambo is not surpassed by the Seckle pear or Crawford's Early peach. Roxbury Russet is the only russet I would think of planting; have had the Golden and English. Bosler or Fallwater was our best bearer and keeper, but like the King and Grimes

Golden, the borers or something kills the bark and they die. If grafted up, I would want to have them, especially the Bosler, which comes in well in the spring. I don't think as much of the Smoke-house and Greening as formerly; the Greening grows too large for me, and not enough of them on the tree. I think we are a little far south for them, and about as far south as the Baldwin and Northern Spy will do their best. York Imperial, I want a few for long keepers, and to remember my good friend from York county, who wants his apple sauce in snits. Ben Davis, I have them now, and some here; don't want to plant any more of them; they are coarse, rough, light in weight, I think, and don't handle like any other apple in the orchard. I found out this fall, in picking, that the birds would not eat them like they did other apples on the trees. I found they tried or sampled one and quit; this is one thing in their favor. Newtown Pippin is a good, long keeper; tree a very slow grower, not as profitable as many others. White Pippin is a more productive apple, and a good keeper and bearer, as well as a great grower, and called for in market when known. We have some more good varieties for winter in our locality, however, I have mentioned enough, as we want only the best and most profitable, and not too many varieties.

HOW TO PLANT THE APPLE.

Select a high location, as far from the creeks or bottom land as is possible to avoid late spring frosts. Take good, dry, deep, rich soil, or make it so by drainage, plowing lime and manure; it won't pay to wait on poor, thin, wet soil to grow trees. Order thrifty, low top, two-year-old trees, with good roots—and by cutting back for a few years, we get a good, large, low tree—one you can gather the fruit from fast and easy. Mark out your ground in straight rows, both ways forty feet apart, with a stake for every tree, and with your outside rows ten feet or more from the fence. Take a fence board six feet long with a pin in each end and a notch sawed out on one side in the middle of the board. Take your board and lay it down with the stake in the notch, drive in your pins to make your mark, take away the board and stake and dig a hole for the tree, which should be plenty large and deep enough to fill with some rich surface soil; set the tree in so that it will be an inch deeper than it was in the nursery, and comes in the notch of the board with the pins in the marks previously made, working the fine soil well around the roots with the hand; tread gently with the foot, and your trees are planted straight both ways and well done.

Mulching with straw is good in a dry season. Have a stake a foot from the tree on the northwest side to tie the tree to for protection, say forty feet apart; I know it will strike Young America that this is a waste of ground. My experience has proven to me

that if you have apple trees far enough apart you will have great, large, thrifty, low-topped trees, full all around and up over and through the whole tree, making three or four acres of apples on one acre of ground. I would rather have ten trees with sufficient room than thirty crowded together. My orchard being planted too close did all right for a number of years until the trees grew large and together, so that with all my thinning out and cutting out my trees were injured. The lower limbs could not bear and died, and I had but one acre of apples on an acre of ground, and then all on the tops of the trees, and hard to get at, as we could hardly get our ladders around and between the trees, and so high up it was both slow and dangerous work to pick the apples. I am not the only person that made this mistake. We plant peach trees between the apple trees and also an extra row of peach trees between the apple row, making three peach for one apple, excepting the outside rows; the peach will be ready to take out before they will injure the apple trees. Varieties to plant, where and how to plant, are the two essentials in growing apples.

PICKING APPLES FROM THE TREES.

In this we have long since dropped the old fashioned way, with bag on your shoulder, which was both hard on the man and apples. We used baskets made for the purpose for some time, when we found that tin buckets made for the purpose holding a half bushel was the most convenient, and much better for the apples. In picking apples in this way you need not bruise them at all. Picking apples is not as much in the moon as in the handling of the fruit, notwithstanding the old time notion. Take your bucket, hook and a long, light, linn wood ladder, and line, and go right around the tree from bottom to top, then up the tree, through the centre, to get what you could not reach from the ladder, having some little chap to empty the bucket as let down by the line from the ladder or tree. Some years ago, I used two buckets so I did not need to wait, and I picked one day seventy-five bushels of Northern Spy, and the next eighty-eight bushels of Baldwins. I worked fast and hard, had full, nice, low-topped trees to work on, and I did my work well, cleaning the trees nicely, and handled my apples right. Sometimes, when the apples are real good we empty the buckets from the tree right into the barrels and take to the house without assorting them; most generally we empty on piles under the trees and sort them and put in barrels to take to the house. We think the open, sweet potato barrel, when we can get them, are the best to keep apples in.

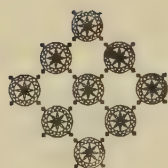
HOUSE FOR APPLES.

Some ten years ago I built an apple house that will hold five hundred barrels of apple three tiers high. The building is twenty by

twenty-four feet; the front on a level with the surface, and a foot declining at the rear; with the inside of the wall filled up with coal ashes for protection from "varments," as well as frost, and the outside of the wall banked up with ground. A strong frame with six by two-inch studding and rafters, boarded on both sides and ceiled under the roof. I had this real well filled with sawdust throughout the building, excepting I used coal ashes between ceiling and roof. Two windows with double shutters, one door wide enough for two men with a barrel to pass through with ease, with a single and double door, the latter opening in the inside and only shut in cold weather. The floor is laid with six-inch boards one inch apart, with a six-inch pipe entering under the upper end of the floor and extending two feet under ground, one hundred feet away from the house towards the northwest and in an upright position ten feet high, with a four-foot funnel turned in same direction. The house has a ventilator on the top in the centre, and with this great current of air coming in under the floor, the ventilation is simply complete; it is my own idea, taken from the ocean steamers forcing air down into their ships. Besides the air coming in under the ground this depth and distance is rather cool in summer and moderate in winter. Slight changes of the weather don't affect the uniformity of the house. The fact is, in mid-summer you find a cool atmosphere in the house, as well as moderate in mid-winter. I have had Baldwins put in when picked from the trees, in open barrels, that have not had over a half dozen rotten apples in a barrel, when marketed in February, and have taken forty barrels of Baldwins to market in June. Boslers were not sufficiently ripe to eat in February. I then had fresh, well kept apples that had lost none of their fine flavor and bright appearance, which is very desirable. You don't want apples from a close cellar after using them that are kept in this way.

Alas, for my mistake here again, the sawdust caused the whole structure, excepting the roof which had the coal ashes, to take the dry rot; the six-inch square post and the studding, all solid white oak, was completely rotted, also the lining and the pine painted weather boarding in places as thin as paper. I suppose I packed the sawdust too lightly, as it was the cause of all this trouble. Well, I had a house to build, and the trouble was to build the house with the roof on first. I asked Mr. Rask, of Greensburg, if I could do so; he said, yes; that he had heard of a man in Sweden that built a chimney by commencing on top, (this was a good ways from home). We propped and tied the roof and took out some of the old timber—some were not quite rotted off—and put in new, and so on all around. We used two rows of three-inch studding with prepared cold storage paper next the weather boarding and between the studding, and also

next the worked pine lining, making two air spaces. We are not ready to claim that we have this house right now, as harvest set in before we had the inside work completed and not having much of an apple crop this year we did not take the time to finish the house. I expect to have a complete job, even if we must put up the third studding to keep the fruit over winter. The apples I have here are not like they would be in point of flavor if I could have kept them in the house all winter.



INDEX OF AUTHORS.

A.		Page.
AGEE, HON. ALVA, The soil our partner,		154
Some points in potato culture,		328
ALLISON, J. W., Strawberry culture,		297
B.		
BARNHART, W. R., Selection of varieties; how to plant, pick and store the apple,		330
BOYD, JAMES, Twelve best herbaceous plants for the amateur,		276
BURNS, J. S., Live stock in Western Pennsylvania,		215
BUTZ, PROF. GEORGE C., Botany on the farm,		131
C.		
CLARK, HARVEY, The birds and the farmers,		177
D.		
DETWILER, B. H., Intensive farming,		193
DICKIE, LAURA M., Some suggestions for furnishing and decorating country homes,		180
DICKINSHIED, IDA M., Hygiene on the farm,		172
DOWNING, HON. S. R., Farming on a large scale,		236
F.		
FREAR, DR. WILLIAM, Education for adult farmers,		142

H.

	Page.
HAMILTON, PROF. JOHN (Secretary of Agriculture), Pennsylvania as a fruit growing State,	316
HAYWARD, PROF. HARRY, A plea for better live stock in Pennsylvania,	238
HEIGES, PROF. S. B., An address,	312
HESS, PROF. E. H., Training for our life work,	135
HOBSON, JOHN, Growing primula chinensis for exhibition,	275
HOOD, HON. G. W., Farm fences and ways over the farm,	167
HOXIE, S., The Holstein-Friesian breed,	255
HULL, GEORGE E., Ideal standards in farming,	121
HURLEY, JOSEPH, How to prepare and plant a permanent asparagus bed for private use	282

I.

IHLENG, PROF. M. C., Geological relation of soils,	244
--	-----

J.

JOHNSON, W. B. K., Is it advisable to grow small fruits in young orchards,	299
--	-----

K.

KLEINHEINEY, WM., Culture of calceolaria hybrida,	279
---	-----

L.

LIGHTY, L. W., Management of dairy cows on the farm,	161
LONSDALE, EDWIN, Flori-culture as a profession,	218
LUSK, MISS MELVINA, Lighting, heating and ventilating the home,	190

M.

MOON, WM. M., Ornamental horticulture,	319
--	-----

P.

PARRY, MRS. ELIZA, How one girl helped,	136
PEACHY, J. H., Nature study in the public schools,	126
PEARSON, DR. LEONARD (State Veterinarian), The relation of the wholesomeness of the stable to the health of its inmates,	151
PIERCE, L. W., Some points in door yard planting and decoration,	303
PHILIPS, THOMAS J., The silo an economic,	147

R.

	Page.
RALSTON, T. N., Curing clover,	181
RANDOLPH, P. S., Advancement of flori-culture in Allegheny county the past forty years,	315
RENTON, THOMAS, The packing and shipping of fruit from a commis- sion merchants standpoint,	324
RICH, C. H., Public roads,	209
RODGERS, MATTHEW, Importance of small things,	184
ROBERTSON, WM., The cultivation of sweet peas,	281

S.

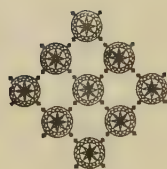
SEEDS, R. S., Soil improvement the keynote of agriculture,	158
SHEARER, MISS MARY, Nature study,	174
SIBLEY, E. H., The Jersey cow,	266
SNAVELY, H. C., Report of general fruit committee,	287

T.

TEMPLE, HON. NORRIS G., Progressive poultry raising,	226
--	-----

W.

WELD, R. J , Our farm garden,	233
WHEATAM, F. W., Trusts,	201
WHITE, H. V., Proof positive, that an investment in sociability will yield a profit to every farmer,	229
WINSLOW, C. M., Ayrshires,	263



INDEX OF SUBJECTS.

A.

	Page.
Act establishing Department of Agriculture,	5
Act incorporating Pennsylvania State Agricultural Society,	13
Act establishing State Board of Agriculture,	25
Act establishing State Live Stock Sanitary Board,	55
Act protecting health of domestic animals,	57
Act, supplement to, for taxation of dogs,	60
Act for prevention of disease from carcasses of animals,	61
Agriculture, soil its keynote,	158
Agricultural chemistry, study of,	131
American Carnation Society,	222
American Jersey Cattle Club,	269
Apples, selection of varieties; how to pick and store,	330
Apples, the most important fruit,	330
Apples, selection of varieties,	331
Apples, how to plant an orchard,	332
Apples, picking for winter use,	333
Apples, house for,	333
Asparagus bed, how to prepare and plant for private use,	282
Asparagus bed, location of,	282
Asparagus bed, preparation of,	282
Asparagus bed, soil for,	283
Asparagus bed, treatment of,	284
Ayrshire cattle,	263
Ayrshire cattle, origin of,	263
Ayrshire cattle, qualities of,	264

B.

Birds and the farmers,	177
Birds, their usefulness to farmers,	178
Birds wrongly judged,	178
Birds, laws protecting,	179
Botany on the farm,	131
Bulletins, list of Department,	10

C.

	Page.
Calceolaria hybrida, culture of,	279
Canning industry in Pennsylvania, need of encouragement,	318
Cattle, the Holstein-Friesian breed,	255
Cattle, the Ayrshire breed,	263
Cattle, the Jersey breed,	266
Clover, curing,	181
Clover, method of curing,	182
Common law and its relation to cattle,	168
Common law, rules of,	168
Common law as to ways over the farm,	170
Common law as to right of way,	170
Country homes, suggestions for decorating,	180
Country homes, requirements for,	180
Cows, the chief element in dairy industry,	151
Cows, exercise and comfort of,	153
Cows, cleanliness of,	154
Cows, management of,	161
Cows, sheltering,	163
Cows, food for,	197

D.

Dairying, factors of success in,	161
Dairying, importance of shelter and food for cows,	163
Dairying, number of cows for,	196
Dairy cows on the farm,	161
Dairy cows, management of,	161
Dairy Union, Pennsylvania, officers of,	94
Dairy Union, Pennsylvania, papers read at annual meeting,	253
Department list of officials,	3
Department of Agriculture, act establishing,	5
Door yard decoration, some points in,	303
Door yard decoration, rules for,	305
Door yard decoration, materials for,	305
Door yard decoration, arranging of,	307

E.

Education, a preparation for correct living,	128
Education, demands for better,	129
Education for the adult farmer,	142

F.

Farm, botany on the,	131
Farm, dairy cows on the,	161
Farm, laws as to ways over the,	170
Farm, hygiene on the,	172
Farmer an independent thinker,	123

	Page.
Farmer, education for the adult,	142
Farmer, reasons for the education of the,	143
Farmer, what he furnishes the soil,	156
Farmer and sociability, the,	229
Farmers and the birds,	177
Farming, ideal standards in,	121
Farming, intensive,	193
Farming as compared with earlier days,	194
Farming, need of large buildings in,	195
Farming on a large scale,	236
Farm fences, laws relating to,	167
Farm garden, the,	233
Farm garden, soil for,	233
Farm garden, selection of seed for,	234
Farmers' Alliance, officers of,	80
Farmers' Alliance, constitution and by-laws of,	81
Farmers' clubs, list of,	87
Farmers' institutes, county chairmen of,	42
Farmers' institutes, list of State lecturers,	43
Farmers' institutes, supplemental list of lectures,	44
Farmers' institutes, Department lecturers,	45
Farmers' institutes, apportionment for season 1900-1901,	45
Farmers' institutes, directions for constituting local committees,	48
Farmers' institutes, round-up meeting of,	52
Farmers' institutes, programme of round-up meeting,	52
Farmers' institutes, papers read at round-up meeting,	119
Farmers' institutes, papers read at,	165
Fences on the farm, law relating thereto,	167
Flori-culture as a profession,	218
Flori-culture in earlier days,	219
Flori-culture in Allegheny county,	315
Forestry association, officers and council of,	85
Fruit, packing and shipping of, from a commission merchant's stand- point,	324
Fruit, how to pack,	325
Fruit, kinds to be packed,	325
Fruit, best means for selling,	326
Fruit, selection, picking and storing of,	330

G.

Grange, State, officers of,	72
Grange, origin of,	74
Growing primula chinensis for exhibition,	275

H.

Herbaceous plants for the amateur,	276
Holstein-Friesian cattle,	255
Holstein-Friesian cattle, history of,	255
Holstein-Friesian cattle in Europe,	256

	Page.
Holstein-Friesian cattle, type of,	257
Holstein-Friesian cattle, constitutional vigor of,	258
Holstein-Friesian cattle, feeding qualities of,	260
Holstein-Friesian cattle, milking qualities of,	261
Holstein-Friesian cattle, system of registration of,	262
Home, importance of small things in the,	185
Home, lighting and heating the,	190
Homes, country, suggestions for decorating,	180
Homes, country, decoration of door yards,	303
Horticulture, ornamental,	319
Horticultural Association, officers of,	96
Horticultural Association, constitution and by-laws of,	97
Horticultural Association, programme of annual meeting,	99
Horticultural Association, membership of,	102
Horticultural Association, minutes of annual meeting,	105
Horticultural Association, papers read at annual meeting of,	285
Horticultural Association, report of general fruit committee,	285
Horticultural Association, observations of correspondents,	291
Horticultural Society of Pennsylvania, officers and committees of,	68
Horticultural Society of Pennsylvania, rules governing exhibitions,	70
Horticultural Society of Pennsylvania, papers read at annual meeting of,	274
How one girl helped,	186
Hygiene on the farm,	172

I.

Institutes, farmers', county chairmen of,	42
Institutes, farmers', list of State lecturers,	43
Institutes, farmers', apportionment for 1900-1901,	45
Institutes, farmers', suggestions to county managers,	49
Institutes, farmers', round-up meeting of,	52
Institutes, farmers', papers read at round-up meeting,	119
Institutes, farmers', papers read at,	165
Intensive farming,	193

J.

Jersey breed of cattle, origin of,	266
Jersey breed of cattle, important points in,	267
Jersey breed of cattle large milkers,	268
Jersey breed of cattle, supremacy of the,	269

L.

Land, reasons for impoverished,	200
Landscape gardening, principles of,	303
Letter of transmittal,	1
Life work, training for,	135
Life work, choice of,	136
Life work, concentration of,	137

	Page.
Life work, reasons for failure in,	138
Life work, self-reliance in,	138
Life work, originality in,	138
Life work, qualifications for,	139
List of Department officials,	3
List of Department publications,	9
List of Department bulletins,	10
List of farmers' clubs,	87
List of local agricultural societies,	88
Live Stock Sanitary Board, officers of,	55
Live Stock Sanitary Board, act establishing,	55
Live Stock Sanitary Board, rules for enforcing act,	58
Live Stock Sanitary Board, extract of rules of,	63
Live Stock Breeders' Association, officers of,	66
Live Stock Breeders' Association, constitution of,	67
Live stock in Western Pennsylvania,	215
Live stock in Western Pennsylvania, observations,	217
Live stock in Pennsylvania, plea for better,	238
Live stock, improved, defined,	239
Live stock, breeding,	240
Live stock, feeding of,	241
Live stock, principles in breeding of,	241
Live stock, care and management of,	242
Live stock, value of registered,	243
Live stock, the Holstein-Friesian breed of,	255
Live stock, the Ayrshire breed of,	266
Live stock, the Jersey breed of,	266

M.

Minutes of annual meeting, State Board of Agriculture,	27
Minutes of annual meeting State Horticultural Association,	105

N.

Nature study,	174
Nature study in the public schools,	126

O.

Officials, Department, list of,	3
Officers of Pennsylvania State Agricultural Society,	13
Officers of State Board of Agriculture,	23
Officers of State Live Stock Sanitary Board,	55
Officers of Live Stock Breeders' Association,	66
Officers of Pennsylvania Horticultural Society,	68
Officers of Patrons of Husbandry,	72
Officers of Farmers' Alliance,	80
Officers of State Poultry Association,	91
Officers of Dairy Union,	94

	Page.
Officers of State Horticultural Association,	96
Orchard, how to plant apple trees in,	332
Orchards, growing small fruits in,	299
Ornamental horticulture, importance of,	319
Ornamental horticulture, lawn ornamentation,	321

P.

Patrons of Husbandry, officers State Grange,	72
Patrons of Husbandry, origin of the Grange,	74
Patrons of Husbandry, declaration of purposes of,	75
Peas, sweet, cultivation of,	281
Pennsylvania as a fruit growing State,	316
Pennsylvania State Agricultural Society, act establishing,	13
Pennsylvania State Agricultural Society, officers and committees of,	15
Pennsylvania State Agricultural Society, constitution and by-laws of,	17
Pennsylvania State Board of Agriculture, members of,	21
Pennsylvania State Board of Agriculture, officers of,	23
Pennsylvania State Board of Agriculture, act establishing,	25
Pennsylvania State Board of Agriculture, minutes of annual meeting,	27
Pennsylvania State Board of Agriculture, papers read at annual meeting, ..	213
Pennsylvania State Live Stock Sanitary Board, act establishing,	55
Pennsylvania State Live Stock Sanitary Board, officers of,	55
Pennsylvania Live Stock Breeders' Association, officers of,	66
Pennsylvania Live Stock Breeders' Association, by-laws of,	67
Pennsylvania Horticultural Society, officers of,	68
Pennsylvania Horticultural Society, rules governing exhibitions,	70
Pennsylvania Horticultural Society, papers read at meeting of,	275
Pennsylvania Farmers' Alliance, officers of,	80
Pennsylvania Farmers' Alliance, constitution and by-laws of,	81
Pennsylvania State College, faculty of,	82
Pennsylvania State College Agricultural Experiment Station, officers and assistants of,	84
Pennsylvania Forestry Association, officers and council of,	85
Pennsylvania State Poultry Association, officers of,	91
Pennsylvania State Poultry Association, constitution of,	92
Pennsylvania Dairy Union, officers of,	94
Pennsylvania Dairy Union, papers read at annual meeting of,	253
Plants, structure of,	131
Plants, roots of,	132
Plants, leaves of,	133
Plants, herbaceous, twelve best for amateur,	276
Plants, culture of <i>calceolaria hybrida</i> ,	279
Potato culture, points in,	328
Potato culture, kind of seed,	328
Potato culture, prevention of disease,	329
Poultry Association, officers of,	91
Poultry Association, constitution of,	92
Poultry a neglected factor in farming,	198
Poultry raising, progressive,	226
Poultry raising, fowls for,	226
Poultry raising, importance of feeding,	228

	Page.
Poultry raising, the incubator,	228
Primroses, culture of,	275
Publications of Department,	9
Public roads,	209
Public roads, how to improve them,	210
Public schools, nature study in,	126

R.

Roads, public.	209
---------------------	-----

S.

Silo, an economic,	147
Silo, description of a,	149
Silo, size of a,	197
Silo, cost of a,	198
Small things, importance of,	184
Small fruits in young orchards,	299
Society of American Florists,	221
Sociability an investment to the farmer,	229
Sociability a part of man's nature,	232
Soil our partner,	154
Soil, what it furnishes,	155
Soil, what the farmer should furnish,	156
Soil, vegetable matter for,	160
Soil improvement,	158
Soils, geological relation of,	244
Soils, energy of,	244
Soils, relation of water to,	244
Soils, origin of,	245
Soils, plant food for,	247
Soils, relation of rocks to,	247
Soils, wash from soils,	248
Soils, moisture in,	249
Stable, relation of its wholesomeness to the health of its inmates,	151
Stable, light and air in the,	162
Stable, chief factors needed in,	152
State Agricultural Society of Pennsylvania, act establishing,	13
State Agricultural Society of Pennsylvania, officers of,	15
State Agricultural Society of Pennsylvania, constitution and by-laws of,	17
State Board of Agriculture, members of,	21
State Board of Agriculture, officers and committees of,	23
State Board of Agriculture, act establishing,	25
State Board of Agriculture, certificate of membership,	26
State Board of Agriculture, minutes of annual meeting,	27
State Board of Agriculture, papers read at annual meeting,	213
State Live Stock Sanitary Board, officers of,	55
State Live Stock Sanitary Board, act establishing,	55

Page.

State Live Stock Sanitary Board, act protecting health of domestic animals,	57
State Live Stock Sanitary Board, rules for enforcement of act,	58
State Live Stock Sanitary Board, extracts of rules of,	63
State Grange, officers of,	72
State College, faculty of,	82
State Poultry Association, officers of,	91
State Horticultural Association, officers of,	96
State Horticultural Association, constitution and by-laws of,	97
State Horticultural Association, programme of annual meeting,	99
State Horticultural Association, membership of,	102
State Horticultural Association, minutes of annual meeting,	105
State Horticultural Association, papers read at annual meeting,	285
State Horticultural Association, report of general fruit committee,	285
State Horticultural Association, observations of correspondents,	291
State Horticultural Association, address of president,	312
Strawberry culture,	297
Strawberry culture, requirements for success,	297
Strawberry culture, preparation of soil,	298
Sweet peas, cultivation of,	281

T.

Trusts,	201
Trusts defined,	202
Trusts may not be evil,	203
Trusts, arguments against,	204
Trusts, evil from,	206
Trusts, their relation to farmers,	208

T

